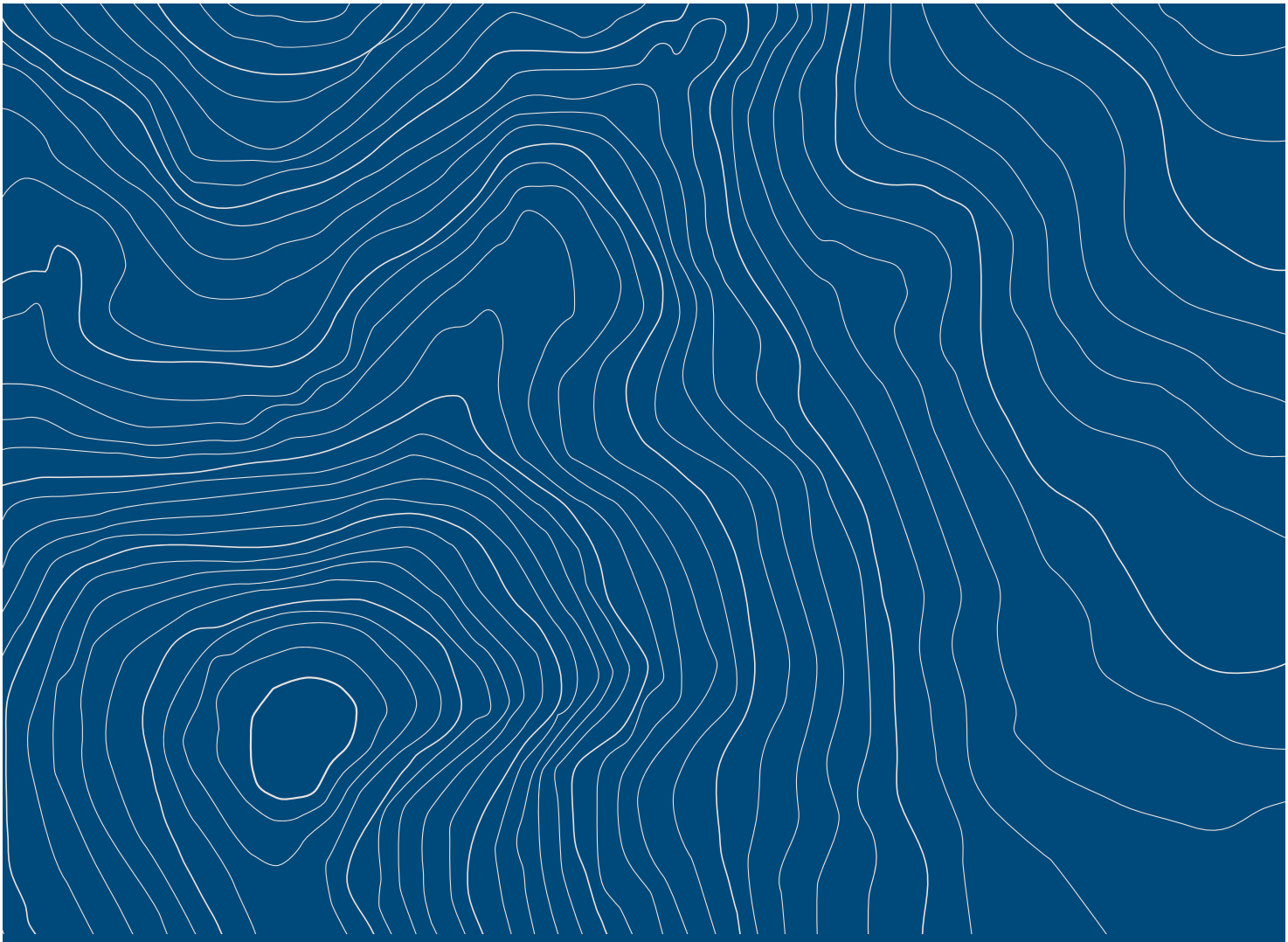

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EIAR Volume 4: Offshore Infrastructure Technical Appendices Appendix 4.3.6-7 Offshore Ornithology Population Viability Analyses

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Dublin Array Wind Farm

Offshore Ornithology Population Viability Analyses

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CO_2e Assessed Organisation

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Acronyms

Term	Meaning
CI (UCI/LCI)	Confidence Interval (Upper/Lower)
C-PGR	Counterfactual of Population Growth Rate
C-PS	Counterfactual of Population Size
PVA	Population Viability Analysis
SD	Standard Deviation
SPA	Special Protection Area

Species Acronyms

Term	Meaning
CT	Common tern
GU	Guillemot
HG	Herring gull
KI	Kittiwake
LB	Lesser black-backed gull
RA	Razorbill

INTRODUCTION

1. This Technical Report provides details of Population Viability Analyses (PVA) conducted for designated seabird populations at Special Protection Areas (SPAs) which have potential connectivity to the Dublin Array Wind Farm. The species and SPAs at which they are designated for which PVA has been undertaken are listed in Table 1.
2. PVA is an approach to predict future changes to population size and growth rate, using numerical population models. Typically, PVA is used to compare various metrics of a population, such as size or growth rate, under a range of conditions, e.g. to compare population size projected into the future under current (baseline population) conditions with that predicted in the presence of additional offshore wind farm (OWF) mortality (impacted population; Searle *et al*. 2019).
3. This report describes methods and parameters used in undertaking PVA. For each run of the PVA output results are presented in both tabulated and graphical form.

Table 1. SPAs and species for which a PVA was conducted.

SPA	Kittiwake	Guillemot	Razorbill	Herring gull	Lesser black-backed gull	Common tern
Howth Head Coast	X					
Lambay Island	X	X	X	X	X	
Ireland's Eye	X	X	X	X		
Wicklow Head	X					
South Dublin Bay and River Tolka Estuary						X

METHODS

4. The Natural England commissioned PVA tool (a version of a matrix model, Caswell, 1989; hereafter 'NEPVA tool') developed by the Centre for Ecology and Hydrology (CEH; Searle et al. 2019) was used for this analysis. The NEPVA tool, which is the recommended tool for undertaking seabird PVA in the UK, is written using the R programming language (R Core Team, 2023) and can be used either from the available online interface[1] or within R. The current population modelling was conducted within R using the downloaded NEPVA tool R scripts.
5. Full input parameters are reported for each SPA-species analysis (see Results). Further information on time periods of analysis, initial population sizes, demographic rates and environmental and demographic considerations are described below.
6. The results for each species-SPA combination include the complete set of input parameters to permit model validation if required (but it should be noted that the random seed specified relates

[1] http://ec2-34-243-66-127.eu-west-1.compute.amazonaws.com/shiny/seabirds/PVATool_Nov2022/R/

to the R version of the PVA functions used, hence use of this value with the online version will not result in identical outputs).

2.1 Time periods

7. The models simulated populations across a thirty-five year period, from 2030 to 2065. Tabulated outputs of populations sizes and growth rates are provided at two time points within the simulated projections, years 25 and 35.

8. It is recommended that an initial 'burn-in' period of at least five years is included in a model simulation to allow aspects such as age distributions to equilibrate prior to the simulated period of interest (Searle *et al.* 2019). However, when modelling small populations this is often not possible as the model fails during the burn-in phase and returns an error message (for example due to 1 or more simulations falling to zero due to chance effects). Thus, for SPA-species with small population sizes (18 out of 36 models) it was not possible to include the burn-in. However, including a burn-in period is not an essential step, and in practice the outputs produced from simulations run with and without a burn-in are indistinguishable. Therefore, this is not considered to have had a material effect on the results obtained.

2.2 Starting population size

9. Starting population size was taken from the most recent count on the Seabird Monitoring Programme database[2], which collates breeding population data of birds regularly breeding in Britain and Ireland. Starting population size (number of breeding adults) with relevant year is presented for each PVA in Table 2.

Table 2. SPA population sizes for each species and SPA for which a PVA was run. Population sizes were used as starting population sizes in PVAs.

SPA	SPA population size (individual breeding adults)	Year
Kittiwake		
Howth Head Coast SPA	3,546	2018
Lambay Island SPA	6,640	2015
Ireland's Eye SPA	802	2016
Wicklow Head SPA	1,348	2022
Guillemot		
Lambay Island SPA	4,410	2015
Ireland's Eye SPA	59,983	2015
Razorbill		
Lambay Island SPA	1,600	2015
Ireland's Eye SPA	7,353	2015
Herring gull		
Lambay Island SPA	796	2016
Ireland's Eye SPA	1,812	2015
Lesser black-backed gull		

[2] https://app.bto.org/seabirds/public/index.jsp

SPA	SPA population size (individual breeding adults)	Year
Lambay Island SPA	690	2018
Common tern		
South Dublin and River Tolka Estuary SPA	988	2016

2.3 Demographic rates

10. The demographic rates (including age at first breeding, productivity mean and SD, adult survival rate mean and SD, and immature survival rates per year mean and SD) used for each species were those described in Horswill and Robinson (2015; Table 3). Standard deviations for immature survival rates are not available for all species; in instances where it is not available, a nominal value of 0.00001 was used to permit analysis as a value of zero cannot be used in the model.

Table 3. Demographic rates used in PVAs.

Species	Kittiwake	Guillemot	Razorbill	Herring gull	Lesser black-backed gull	Common tern
Age at first breeding	4	6	5	5	5	3
Productivity rate per pair – mean (SD)	0.508 (0.290)	0.549 (0.294)	0.538 (0.203)	0.638 (0.379)	0.438 (0.356)	0.764 (0.47)
Adult survival rate – mean (SD)	0.854 (0.077)	0.940 (0.025)	0.895 (0.067)	0.834 (0.079)	0.885 (0.056)	0.883 (0.014)
Immatures survival rates 0 to 1 mean (SD)	0.854 (0.077)	0.560 (0.058)	0.794 (0.067)	0.794 (0.079)	0.820 (0.056)	0.761 (0.00001)
Immatures survival rates 1 to 2 mean (SD)	0.854 (0.077)	0.792 (0.152)	0.794 (0.067)	0.834 (0.079)	0.885 (0.056)	0.761 (0.00001)
Immatures survival rates 2 to 3 mean (SD)	0.854 (0.077)	0.917 (0.098)	0.895 (0.067)	0.834 (0.079)	0.885 (0.056)	0.761 (0.00001)
Immatures survival rates 3 to 4 mean (SD)	0.854 (0.077)	0.938 (0.107)	0.895 (0.067)	0.834 (0.079)	0.885 (0.056)	-
Immatures survival rates 4 to 5 mean (SD)	-	0.940 (0.025)	0.895 (0.067)	0.834 (0.079)	0.885 (0.056)	-
Immatures survival rates 5 to 6 mean (SD)	-	0.940 (0.025)	-	-	-	

2.4 Stochasticity and density dependence

11. The PVAs were run as stochastic models that incorporate environmental and demographic variability in the input parameters, with 5,000 simulations for each model scenario. A matched runs approach was used where impacted populations had the same stochastic variation as unimpacted (baseline) populations for each individual simulation run.

12. Although seabird populations in general are well known to be regulated by resource competition, referred to hereafter as density dependence (e.g. Merrall *et al*. 2024), there is a reluctance among the UK's statutory advisors to consider density dependent PVA outputs for impact assessment due to limited site-specific information on its operation and a presumption that density

independent PVA provide more conservative results, thereby satisfying the precautionary principle. Therefore, the PVA reported on here did not include density dependent regulation, meaning that average demographic rates remain the same irrespective of population growth or decline. This contrasts with the natural processes of resource constraint which prevent unlimited (e.g. exponential) growth and tend to buffer declining populations through reduced competition for aspects such as food, nesting spaces and mates.

2.5 Reported PVA outputs and metrics

13. 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 (C-PS) and the counterfactual of population growth rate (C-PGR).

    Per NatureScot Guidance Note 11 (2023)[3]:

    > *We advise the two ratio metrics that compare impacted and un-impacted populations should be applied in both EIA and HRA. The two metrics that should be used are generally termed 'Counterfactual (ratio) of final population size' and 'Counterfactual (ratio) of population growth-rate'.*
    >
    > *In addition to the ratio metrics, other metrics, e.g. predicted final population size, can be supplied for context, and output graphs of PVA runs should be supplied where possible.*

14. The counterfactuals of population growth rate (C-PGR, the average annual rate of change over the projected period) and population size (C-PS) and the 50th quantiles for unimpacted and impacted populations[4] are provided for each PVA scenario run at 25 and 35 year projections.

15. 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 (Cook *et al*. 2017).

16. A graph for each model run is also provided which presents all the different scenarios on the same axes to allow straightforward comparison of impacted and unimpacted predictions. The figures present population size against time, allowing population size at any point in time under both baseline and impacted scenarios, to be read.

17. The C-PGR and C-PS are provided as the median, mean, standard deviation and 95% confidence intervals. Although the two counterfactual measures may appear to be equally informative with respect to understanding the population consequences of impacts, which one is more appropriate depends on whether density dependent regulation has been included. Consideration of the properties of density dependent and density independent population projections illustrates why this is: a population regulated by density dependent feedback will maintain itself around an equilibrium level. Since there is no long-term growth or decline for such a population, when an impact is applied the population growth rate will only change in the short term, following which the population will settle at a new, lower, equilibrium size. Hence the change in growth rate (i.e. C-PGR) is of limited value for understanding the effect of an impact. In contrast, the

[3] https://www.nature.scot/doc/guidance-note-11-guidance-support-offshore-wind-applications-marine-ornithology-recommendations

[4] the quantile from the unimpacted population that matched the 50% quantile for the impacted population and the quantile from the impacted population that match the 50% quantile for the unimpacted population, respectively.

change in population size (C-PS) provides useful information on how much smaller the population will be in the presence of the impact. When a population is simulated without regulation (i.e. density independent), the population will grow or decline exponentially. The baseline and impacted populations will both change in this manner but the difference between the two will increase with duration as the baseline population grows more rapidly. Hence, the time point when the differences are considered has a large effect on the C-PS value obtained and how this is interpreted. However, the average growth rate of a density independent population is constant and therefore a comparison of the baseline and impacted growth rates (i.e. the C-PGR) is insensitive to the duration over which the comparison is made. Thus, for density independent PVA, as presented here, **the C-PGR is considered to be the more robust and reliable metric for understanding the potential consequences of an impact**.

2.6 Scenarios

18. Results are reported for the 'project only', which presents results of impacts from the proposed development alone, and for in-combination ('in-combo'), which presents results of impacts for the project in combination with other wind farms.

RESULTS

19. The PVA results per SPA-species and scenario, including input parameters, are reported below. Table and figure titles reflect different displacement and mortality rate scenarios advised by NatureScot Guidance Note 8 (2023)[5], e.g. '30%, 1% without macroavoidance' indicates that the scenario analysed was derived with a 30% displacement rate and a 1% displacement mortality rate plus collision mortality estimated without applying the macroavoidance implicit in the displacement rates. Captions with two displacement mortality rates reflect different mortality rates in the breeding and non-breeding period, with the higher value applied to the breeding period and the lower value applied to the non-breeding period. The plots present the median predictions for the baseline and impact runs (solid lines) with correspondingly coloured dashed lines providing the upper and lower 95% confidence intervals.

[5] https://www.nature.scot/doc/guidance-note-8-guidance-support-offshore-wind-applications-marine-ornithology-advice-assessing

Table 4. Inputs: Kittiwake Howth Head Coast SPA, 30%, 1% without macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Howth Head	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	2030
Random seed	1	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0009362662
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.002416808
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	3546		
Year	2018		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 5. Outputs: Kittiwake Howth Head Coast SPA, 30%, 1% without macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	3.3	0.0009362662	25	0.9990	0.9990	0.0022	0.9946	1.0035	0.9733	0.9758	0.0626	0.8604	1.1041	48.24	51.90
In-combo	8.6	0.0024168077	25	0.9972	0.9972	0.0022	0.9927	1.0015	0.9292	0.9312	0.0591	0.8184	1.0561	44.40	56.04
Project alone	3.3	0.0009362662	35	0.9990	0.9990	0.0020	0.9950	1.0029	0.9625	0.9657	0.0740	0.8294	1.1199	47.62	52.50
In-combo	8.6	0.0024168077	35	0.9972	0.9971	0.0020	0.9931	1.0012	0.9014	0.9045	0.0702	0.7736	1.0564	43.18	57.10

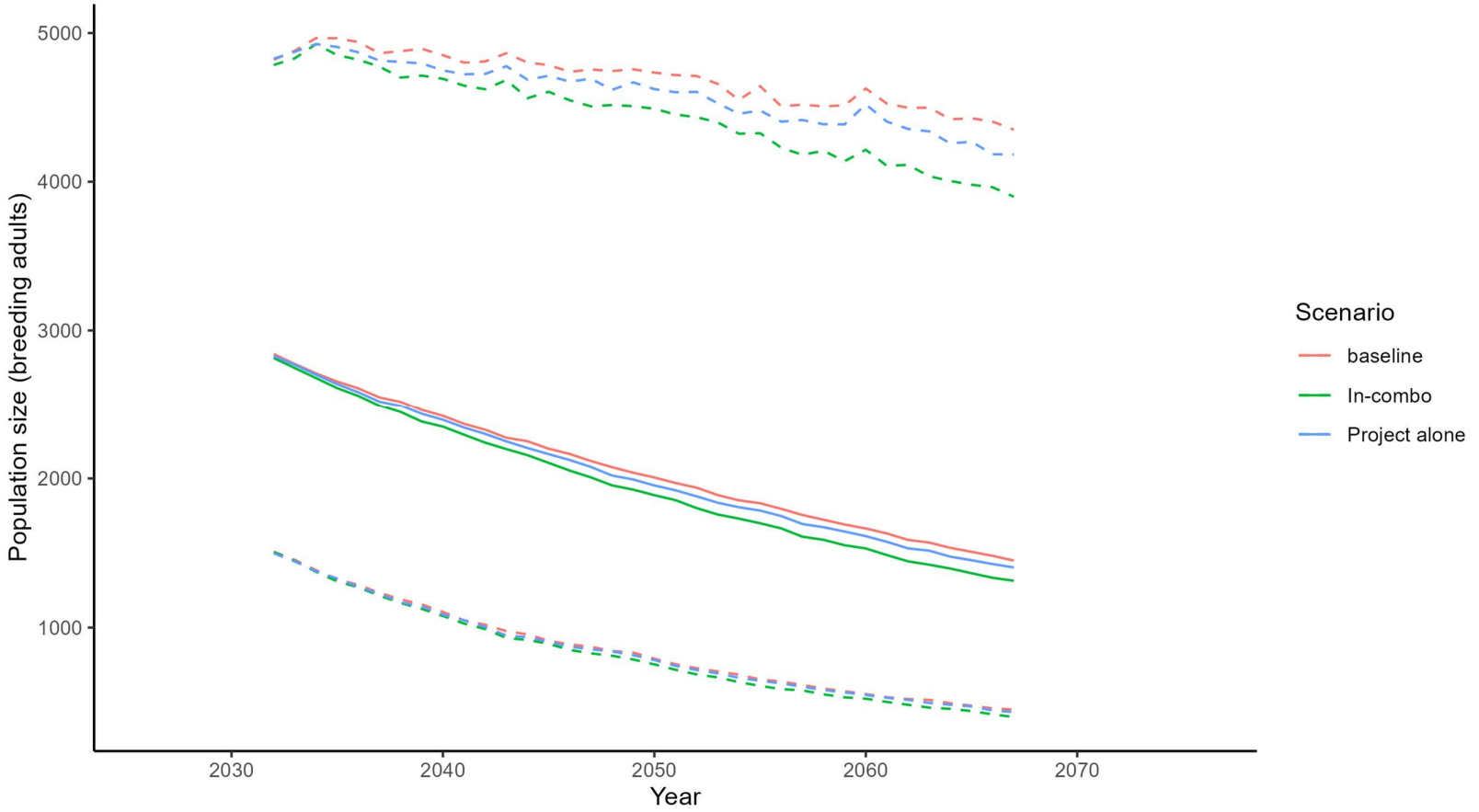

Figure 1. Kittiwake Howth Head Coast SPA, 30%, 1% without macroavoidance

Table 6. Inputs: Kittiwake Howth Head Coast SPA, 30%, 3% without macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Howth Head	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	2030
Random seed	2	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.001105471
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.002586012
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	3546		
Year	2018		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 7. Outputs: Kittiwake Howth Head Coast SPA, 30%, 3% without macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	3.9	0.001105471	25	0.9987	0.9987	0.0022	0.9942	1.0032	0.9663	0.9682	0.0619	0.8518	1.0954	47.32	52.62
In-combo	9.2	0.002586012	25	0.9969	0.9969	0.0023	0.9925	1.0013	0.9219	0.9236	0.0598	0.8115	1.0478	43.68	56.34
Project alone	3.9	0.001105471	35	0.9987	0.9987	0.0020	0.9947	1.0026	0.9536	0.9558	0.0734	0.8183	1.1092	46.88	53.30
In-combo	9.2	0.002586012	35	0.9969	0.9969	0.0020	0.9928	1.0010	0.8936	0.8970	0.0700	0.7666	1.0458	42.36	57.26

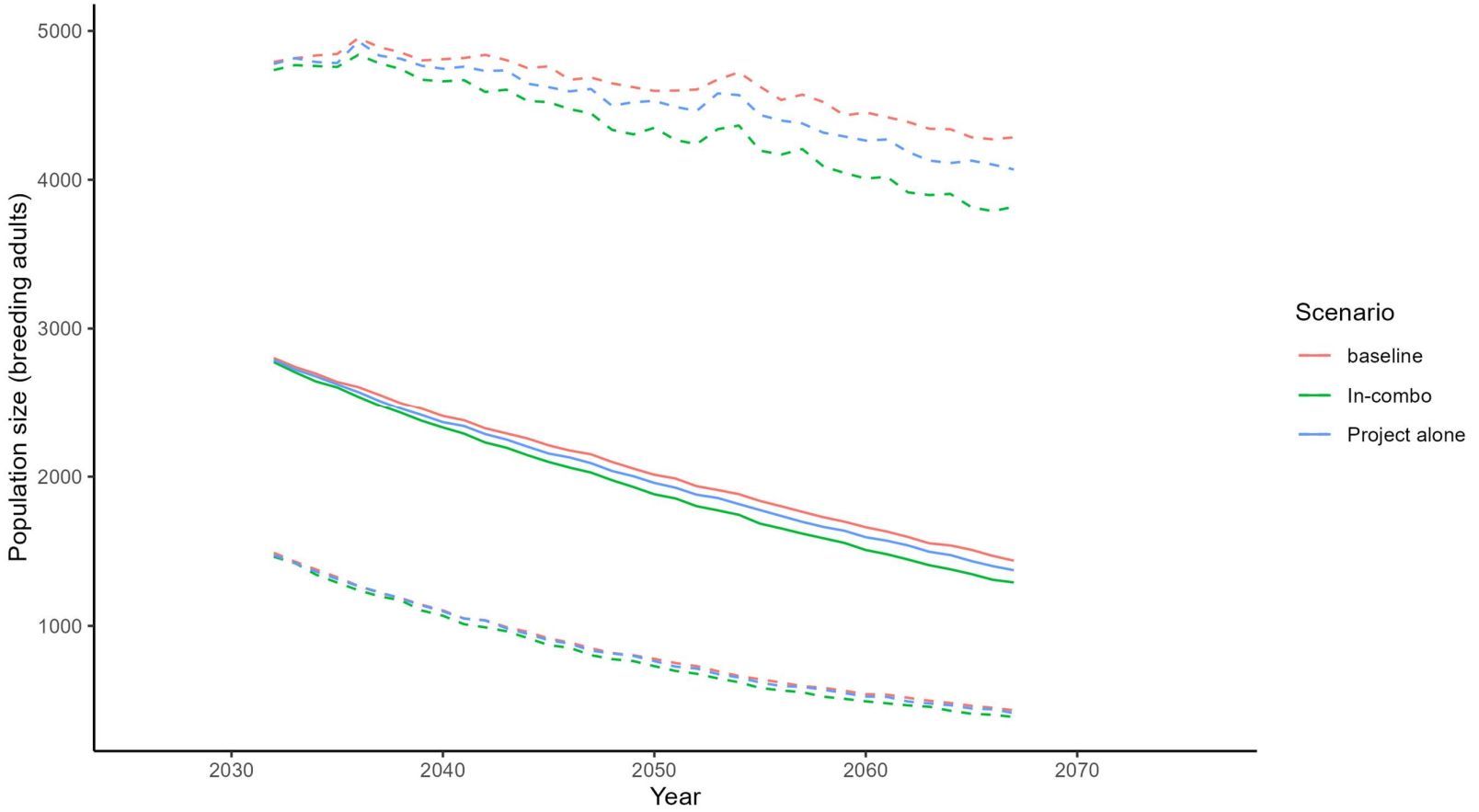

Figure 2. Kittiwake Howth Head Coast SPA, 30%, 3% without macroavoidance

Table 8. Inputs: Kittiwake Howth Head Coast SPA, 30%, 1% with macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Howth Head	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	2030
Random seed	3	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.000679639
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.00216018
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	3546		
Year	2018		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 9. Outputs: Kittiwake Howth Head Coast SPA, 30%, 1% with macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	2.4	0.000679639	25	0.9992	0.9992	0.0022	0.9949	1.0037	0.9807	0.9829	0.0620	0.8653	1.1125	48.46	51.88
In-combo	7.7	0.002160180	25	0.9975	0.9975	0.0023	0.9929	1.0019	0.9361	0.9378	0.0612	0.8180	1.0650	44.96	55.32
Project alone	2.4	0.000679639	35	0.9992	0.9992	0.0020	0.9953	1.0032	0.9714	0.9761	0.0747	0.8378	1.1266	48.36	51.82
In-combo	7.7	0.002160180	35	0.9975	0.9975	0.0020	0.9935	1.0015	0.9131	0.9159	0.0709	0.7793	1.0661	44.18	56.50

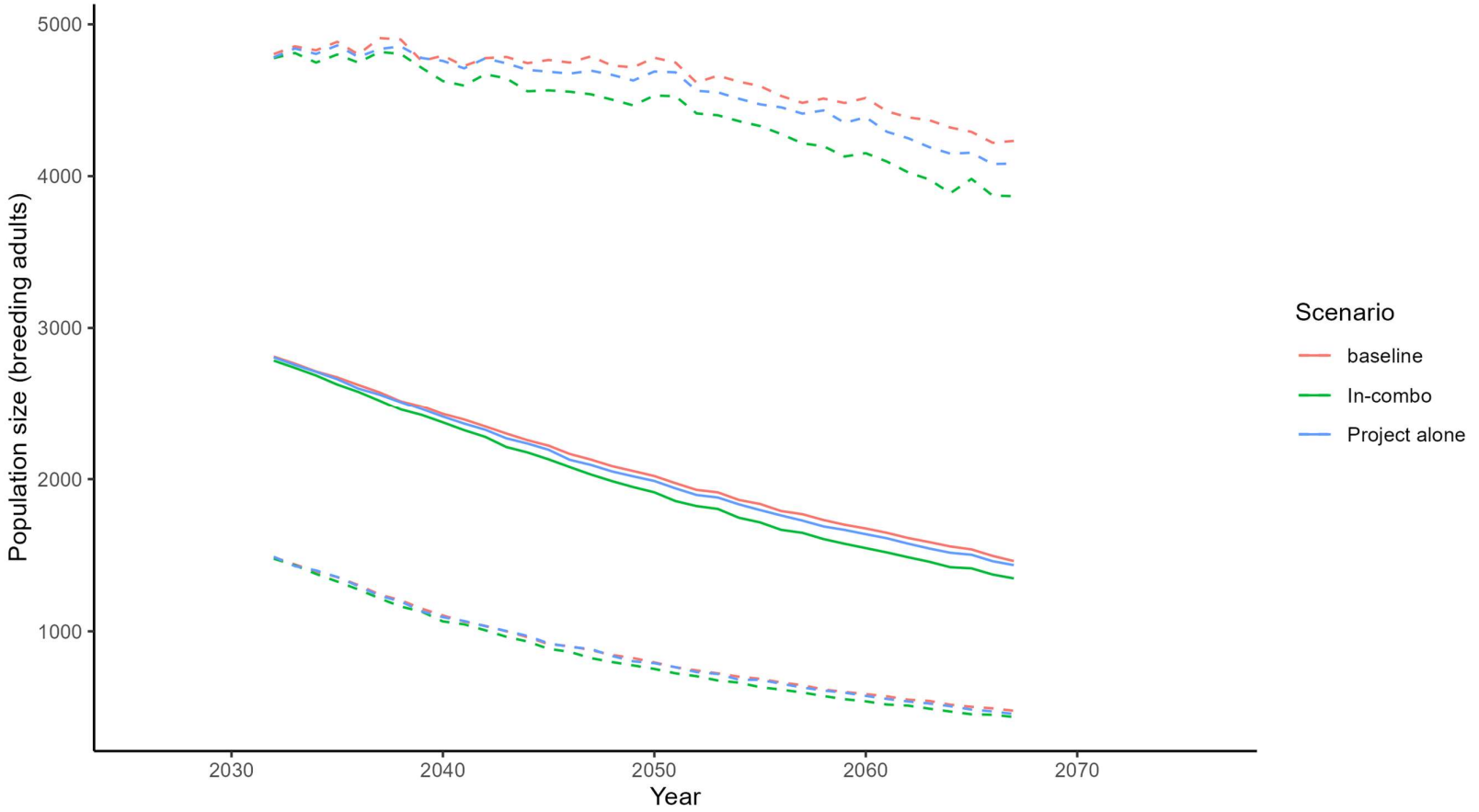

Figure 3. Kittiwake Howth Head Coast SPA, 30%, 1% with macroavoidance

Table 10. Inputs: Kittiwake Howth Head Coast SPA, 30%, 3% with macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Howth Head	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	2030
Random seed	4	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0008516638
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.002332205
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	3546		
Year	2018		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 11. Outputs: Kittiwake Howth Head Coast SPA, 30%, 3% with macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	3.0	0.0008516638	25	0.9990	0.9990	0.0022	0.9943	1.0033	0.9730	0.9755	0.0638	0.8553	1.1096	48.20	52.02
In-combo	8.3	0.0023322053	25	0.9973	0.9972	0.0022	0.9929	1.0016	0.9297	0.9321	0.0595	0.8220	1.0552	44.82	55.36
Project alone	3.0	0.0008516638	35	0.9990	0.9990	0.0020	0.9949	1.0029	0.9642	0.9670	0.0756	0.8239	1.1294	47.74	52.38
In-combo	8.3	0.0023322053	35	0.9973	0.9973	0.0020	0.9932	1.0013	0.9056	0.9085	0.0718	0.7746	1.0576	43.68	56.66

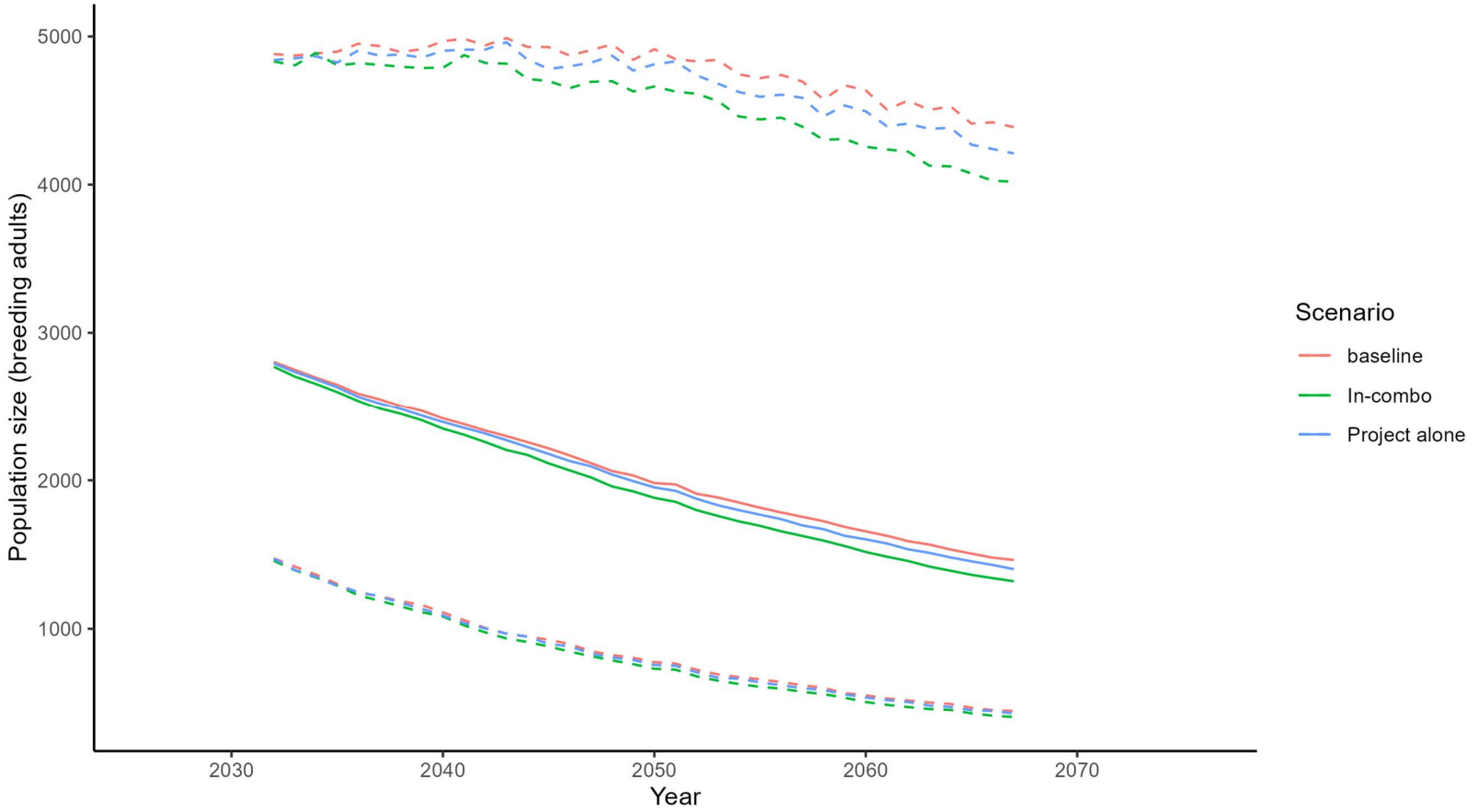

Figure 4. Kittiwake Howth Head Coast SPA, 30%, 3% with macroavoidance

Table 12. Inputs: Kittiwake Lambay Island SPA, 30%, 1% without macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Lambay SPA,	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	2030
Random seed	5	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0003584337
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.001831325
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	6640		
Year	2015		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 13. Outputs: Kittiwake Lambay Island SPA, 30%, 1% without macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	2.4	0.0003584337	25	0.9996	0.9996	0.0017	0.9963	1.0029	0.9893	0.9906	0.0486	0.8974	1.0923	48.96	50.90
In-combo	12.2	0.0018313253	25	0.9978	0.9978	0.0017	0.9945	1.0012	0.9455	0.9462	0.0464	0.8583	1.0432	45.68	54.04
Project alone	2.4	0.0003584337	35	0.9996	0.9996	0.0015	0.9966	1.0026	0.9855	0.9869	0.0582	0.8779	1.1102	49.34	50.84
In-combo	12.2	0.0018313253	35	0.9978	0.9978	0.0015	0.9948	1.0008	0.9242	0.9260	0.0544	0.8253	1.0377	45.30	54.86

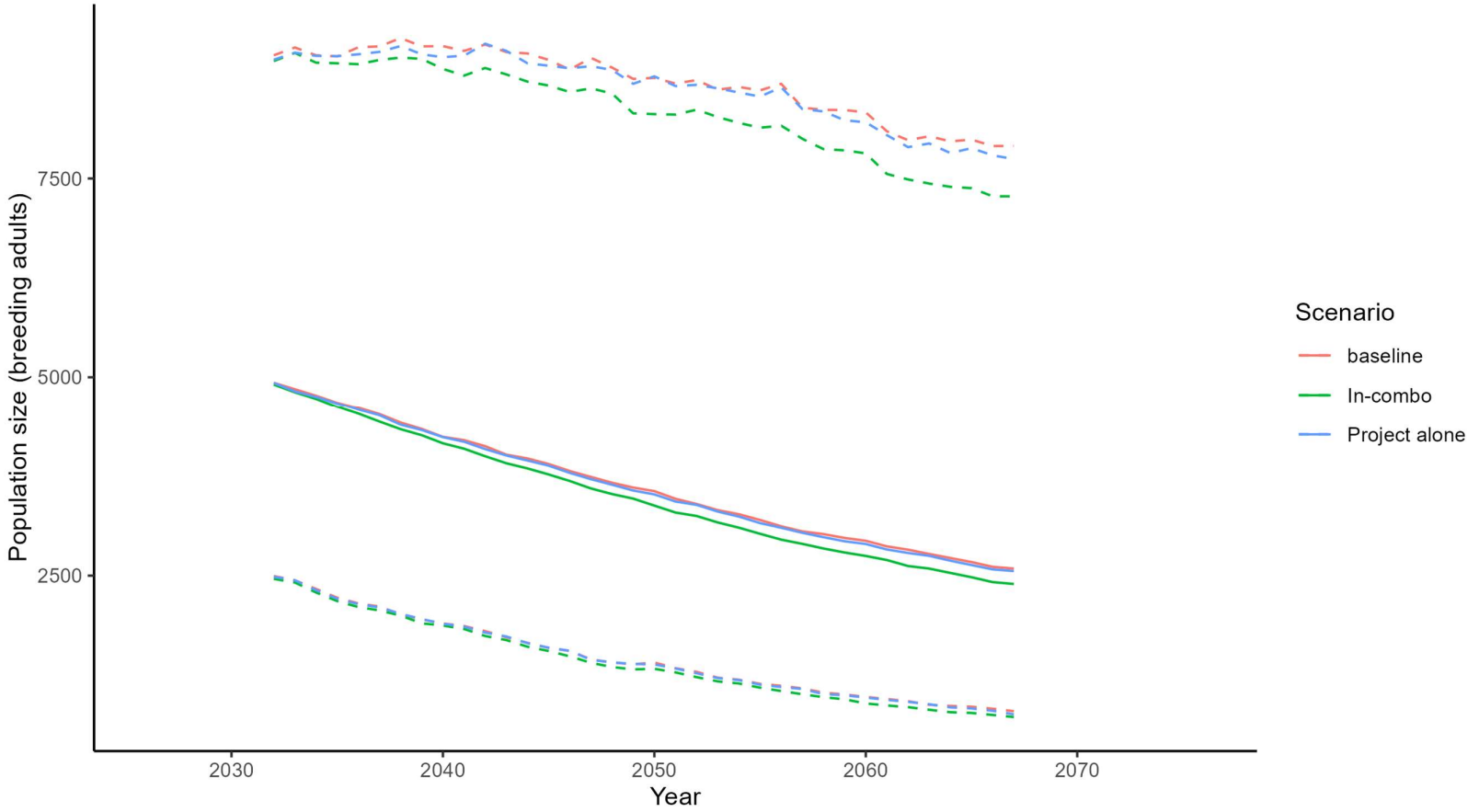

Figure 5. Kittiwake Lambay Island SPA, 30%, 1% without macroavoidance

Table 14. Inputs: Kittiwake Lambay Island SPA, 30%, 3% without macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Lambay SPA,	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	2030
Random seed	6	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0004262048
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.001899096
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	6640		
Year	2015		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 15. Outputs: Kittiwake Lambay Island SPA, 30%, 3% without macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	2.8	0.0004262048	25	0.9995	0.9995	0.0017	0.9962	1.0030	0.9875	0.9885	0.0493	0.8969	1.0935	48.88	51.00
In-combo	12.6	0.0018990964	25	0.9977	0.9977	0.0017	0.9943	1.0010	0.9426	0.9436	0.0469	0.8543	1.0377	45.68	54.54
Project alone	2.8	0.0004262048	35	0.9995	0.9995	0.0015	0.9965	1.0025	0.9824	0.9841	0.0589	0.8759	1.1088	48.78	51.10
In-combo	12.6	0.0018990964	35	0.9978	0.9977	0.0015	0.9947	1.0007	0.9220	0.9236	0.0556	0.8184	1.0369	44.42	55.76

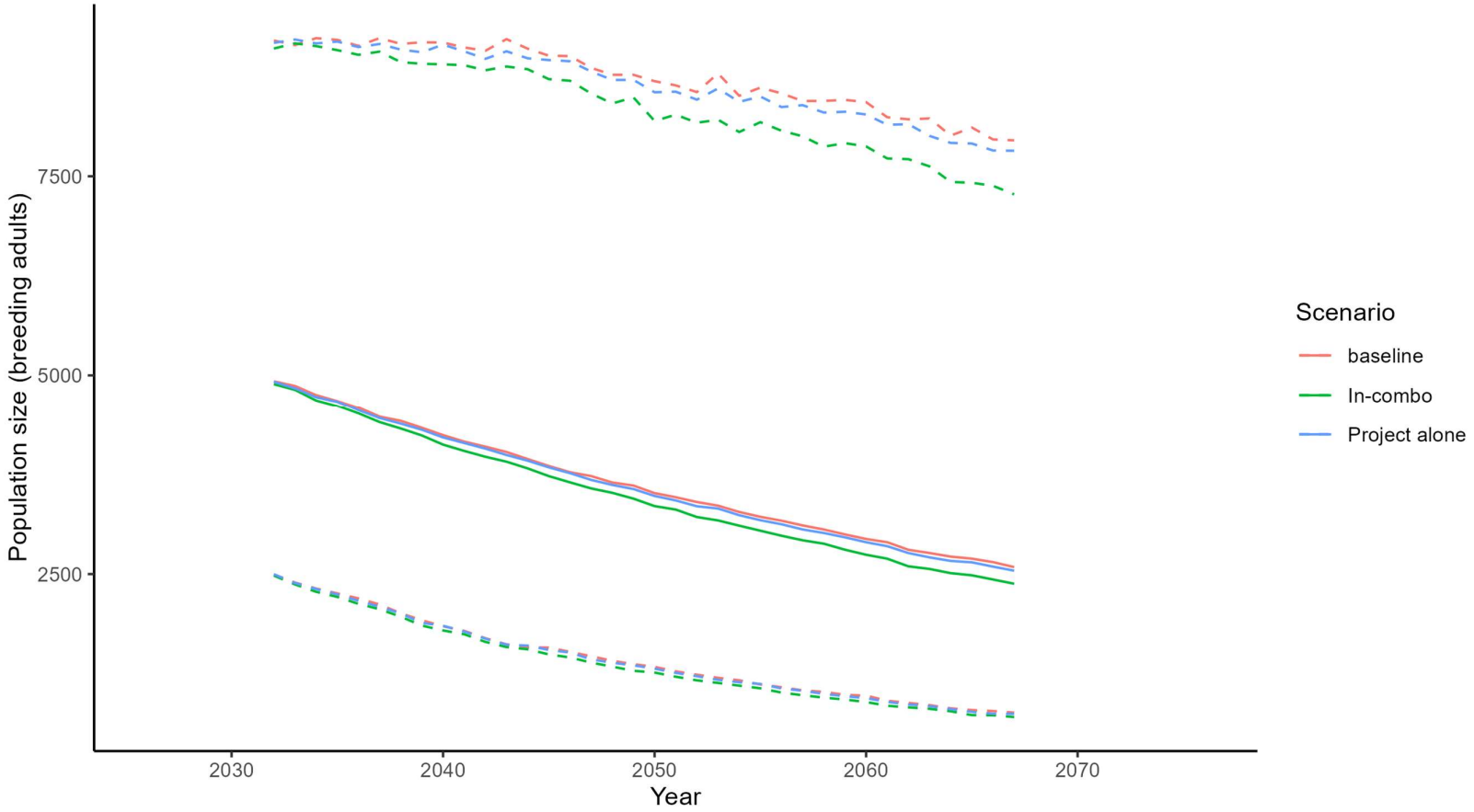

Figure 6. Kittiwake Lambay Island SPA, 30%, 3% without macroavoidance

Table 16. Inputs: Kittiwake Lambay Island SPA, 30%, 1% with macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Lambay SPA,	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	2030
Random seed	7	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0002605422
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.001733434
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	6640		
Year	2015		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 17. Outputs: Kittiwake Lambay Island SPA, 30%, 1% with macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	1.7	0.0002605422	25	0.9997	0.9997	0.0017	0.9962	1.0030	0.9920	0.9933	0.0501	0.8951	1.0967	49.84	50.24
In-combo	11.5	0.0017334337	25	0.9980	0.9979	0.0017	0.9946	1.0014	0.9484	0.9497	0.0477	0.8591	1.0498	45.70	53.60
Project alone	1.7	0.0002605422	35	0.9997	0.9997	0.0015	0.9967	1.0027	0.9894	0.9907	0.0583	0.8800	1.1085	49.08	50.86
In-combo	11.5	0.0017334337	35	0.9980	0.9980	0.0015	0.9950	1.0010	0.9311	0.9322	0.0552	0.8250	1.0473	44.80	55.18

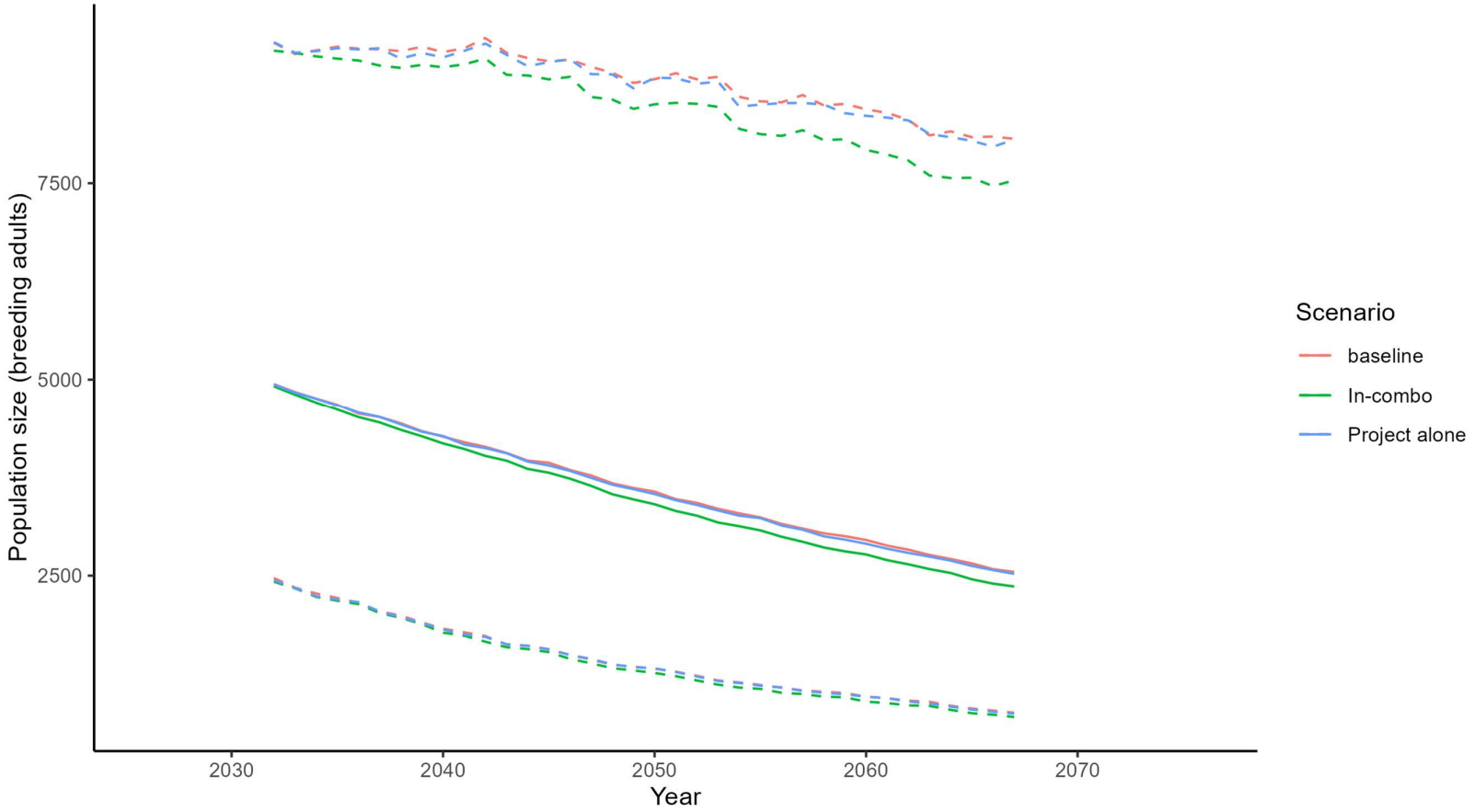

Figure 7. Kittiwake Lambay Island SPA, 30%, 1% with macroavoidance

Table 18. Inputs: Kittiwake Lambay Island SPA, 30%, 3% with macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Lambay SPA,	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	2030
Random seed	8	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0003298193
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.001802711
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	6640		
Year	2015		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 19. Outputs: Kittiwake Lambay Island SPA, 30%, 3% with macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	2.2	0.0003298193	25	0.9996	0.9996	0.0016	0.9963	1.0028	0.9896	0.9907	0.0475	0.8984	1.0863	49.12	50.50
In-combo	12.0	0.0018027108	25	0.9979	0.9979	0.0017	0.9945	1.0012	0.9459	0.9467	0.0467	0.8565	1.0435	45.68	54.14
Project alone	2.2	0.0003298193	35	0.9996	0.9996	0.0014	0.9967	1.0025	0.9848	0.9867	0.0559	0.8770	1.1025	48.82	51.56
In-combo	12.0	0.0018027108	35	0.9979	0.9979	0.0015	0.9949	1.0008	0.9249	0.9269	0.0539	0.8241	1.0361	45.44	55.36

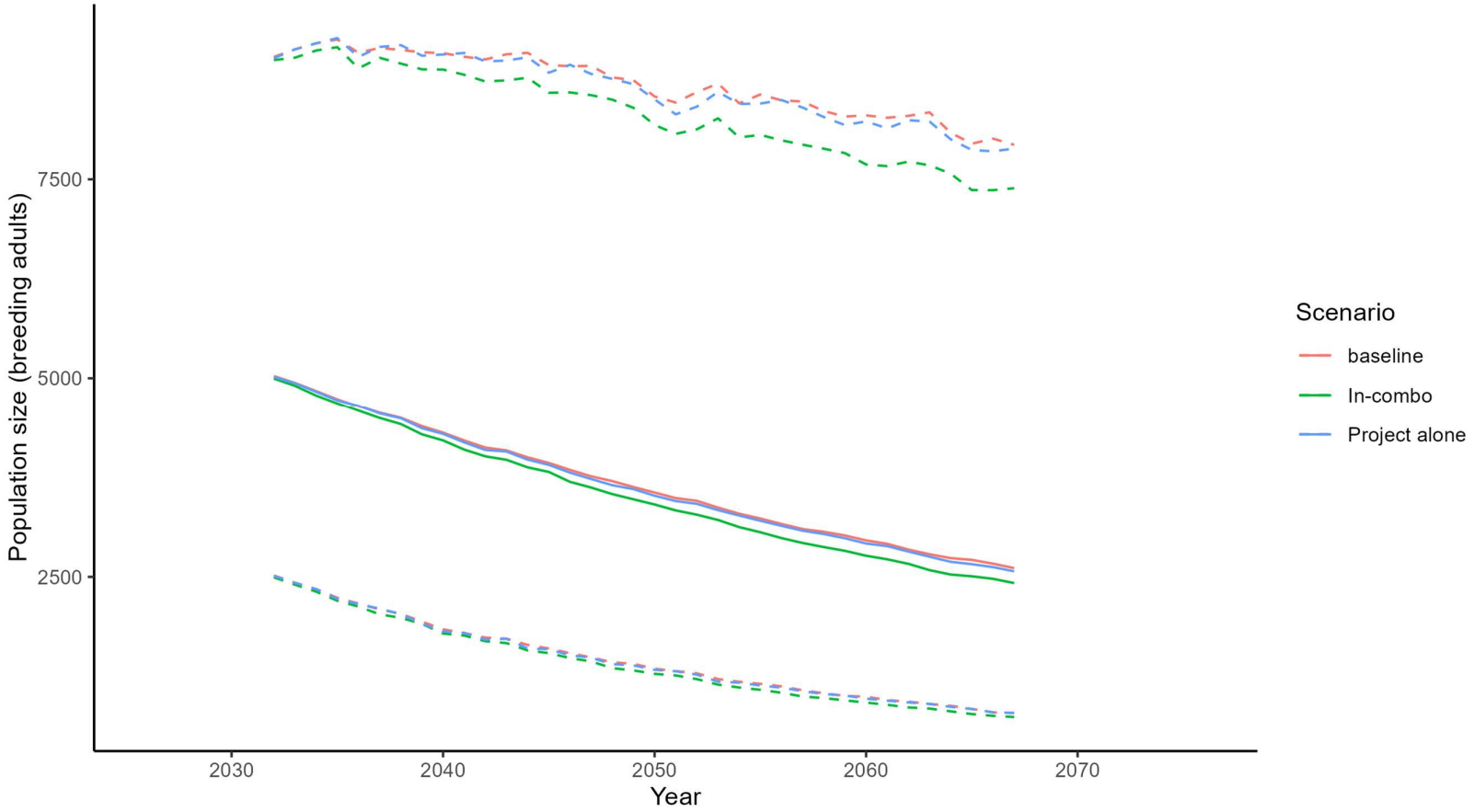

Figure 8. Kittiwake Lambay Island SPA, 30%, 3% with macroavoidance

Table 20. Inputs: Kittiwake Ireland's Eye SPA, 30%, 1% without macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Ireland's Eye	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	2030
Random seed	9	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0006608479
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.002643392
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	802		
Year	2016		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 21. Outputs: Kittiwake Ireland's Eye SPA, 30%, 1% without macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.5	0.0006608479	25	0.9993	0.9993	0.0048	0.9897	1.0089	0.9836	0.9918	0.1403	0.7436	1.2967	48.42	51.40
In-combo	2.1	0.0026433915	25	0.9969	0.9969	0.0048	0.9873	1.0065	0.9213	0.9309	0.1317	0.7029	1.2138	44.46	56.08
Project alone	0.5	0.0006608479	35	0.9993	0.9992	0.0043	0.9906	1.0080	0.9735	0.9860	0.1651	0.7000	1.3440	48.04	51.94
In-combo	2.1	0.0026433915	35	0.9969	0.9968	0.0045	0.9879	1.0055	0.8940	0.9051	0.1562	0.6303	1.2409	42.62	57.22

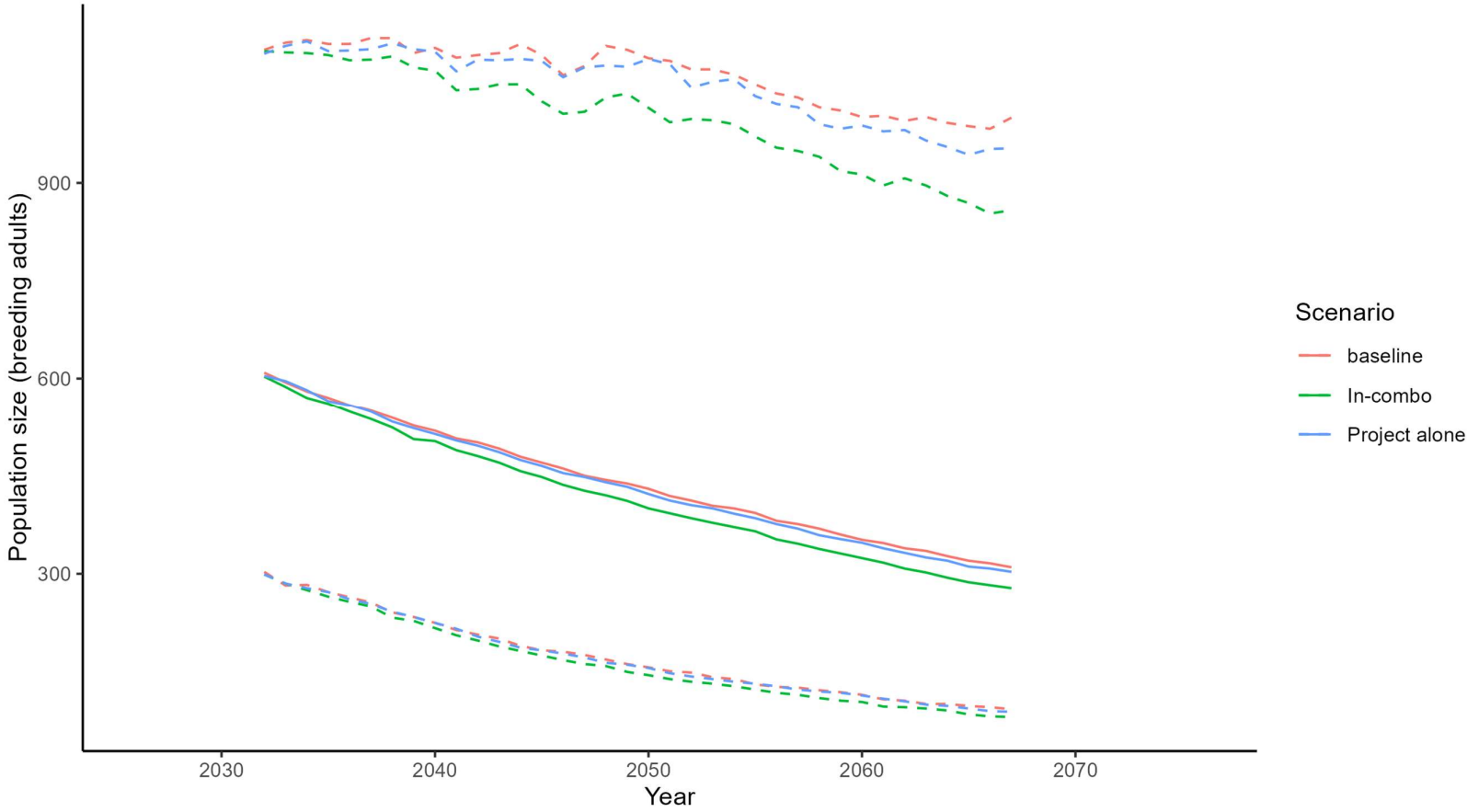

Figure 9. Kittiwake Ireland's Eye SPA, 30%, 1% without macroavoidance

Table 22. Inputs: Kittiwake Ireland's Eye SPA, 30%, 3% without macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Ireland's Eye	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	2030
Random seed	10	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0007855362
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.00276808
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	802		
Year	2016		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 23. Outputs: Kittiwake Ireland's Eye SPA, 30%, 3% without macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.6	0.0007855362	25	0.9990	0.9991	0.0048	0.9897	1.0090	0.9747	0.9874	0.1418	0.7434	1.3009	48.02	52.00
In-combo	2.2	0.0027680798	25	0.9967	0.9967	0.0049	0.9870	1.0063	0.9195	0.9293	0.1346	0.6905	1.2156	43.16	57.00
Project alone	0.6	0.0007855362	35	0.9990	0.9991	0.0044	0.9904	1.0078	0.9662	0.9822	0.1708	0.6863	1.3637	48.10	52.62
In-combo	2.2	0.0027680798	35	0.9967	0.9967	0.0044	0.9880	1.0055	0.8899	0.9033	0.1577	0.6364	1.2530	42.20	58.22

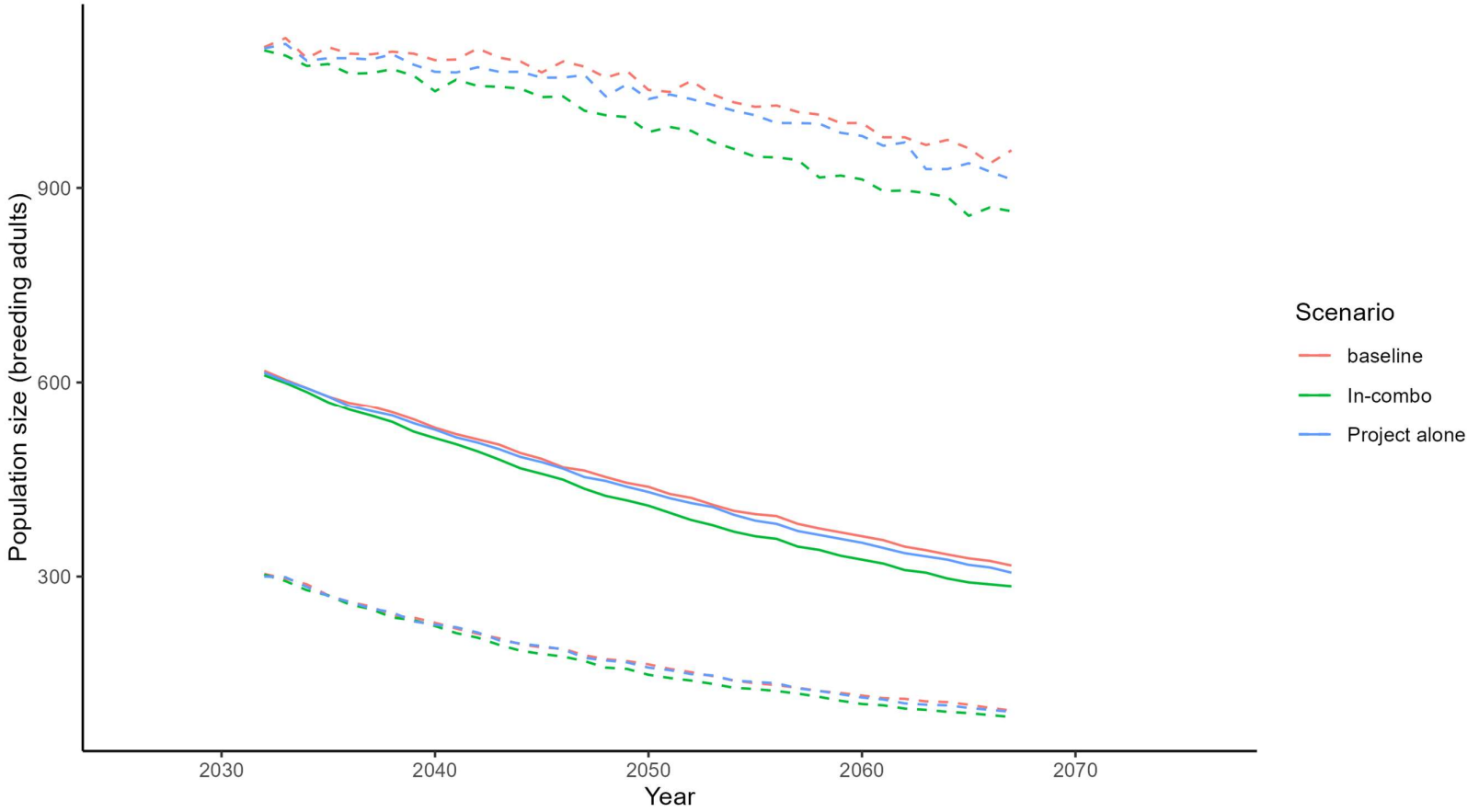

Figure 10. Kittiwake Ireland's Eye SPA, 30%, 3% without macroavoidance

Table 24. Inputs: Kittiwake Ireland's Eye SPA, 30%, 1% with macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Ireland's Eye	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	2030
Random seed	11	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0004862843
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.002468828
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	802		
Year	2016		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 25. Outputs: Kittiwake Ireland's Eye SPA, 30%, 1% with macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.4	0.0004862843	25	0.9995	0.9995	0.0048	0.9898	1.0093	0.9849	0.9968	0.1410	0.7452	1.3145	48.46	51.30
In-combo	2.0	0.0024688279	25	0.9970	0.9970	0.0049	0.9872	1.0067	0.9226	0.9341	0.1356	0.6912	1.2265	43.34	56.56
Project alone	0.4	0.0004862843	35	0.9995	0.9995	0.0043	0.9907	1.0083	0.9797	0.9954	0.1697	0.7059	1.3761	48.40	52.04
In-combo	2.0	0.0024688279	35	0.9971	0.9971	0.0044	0.9883	1.0058	0.8991	0.9133	0.1591	0.6355	1.2631	42.32	57.30

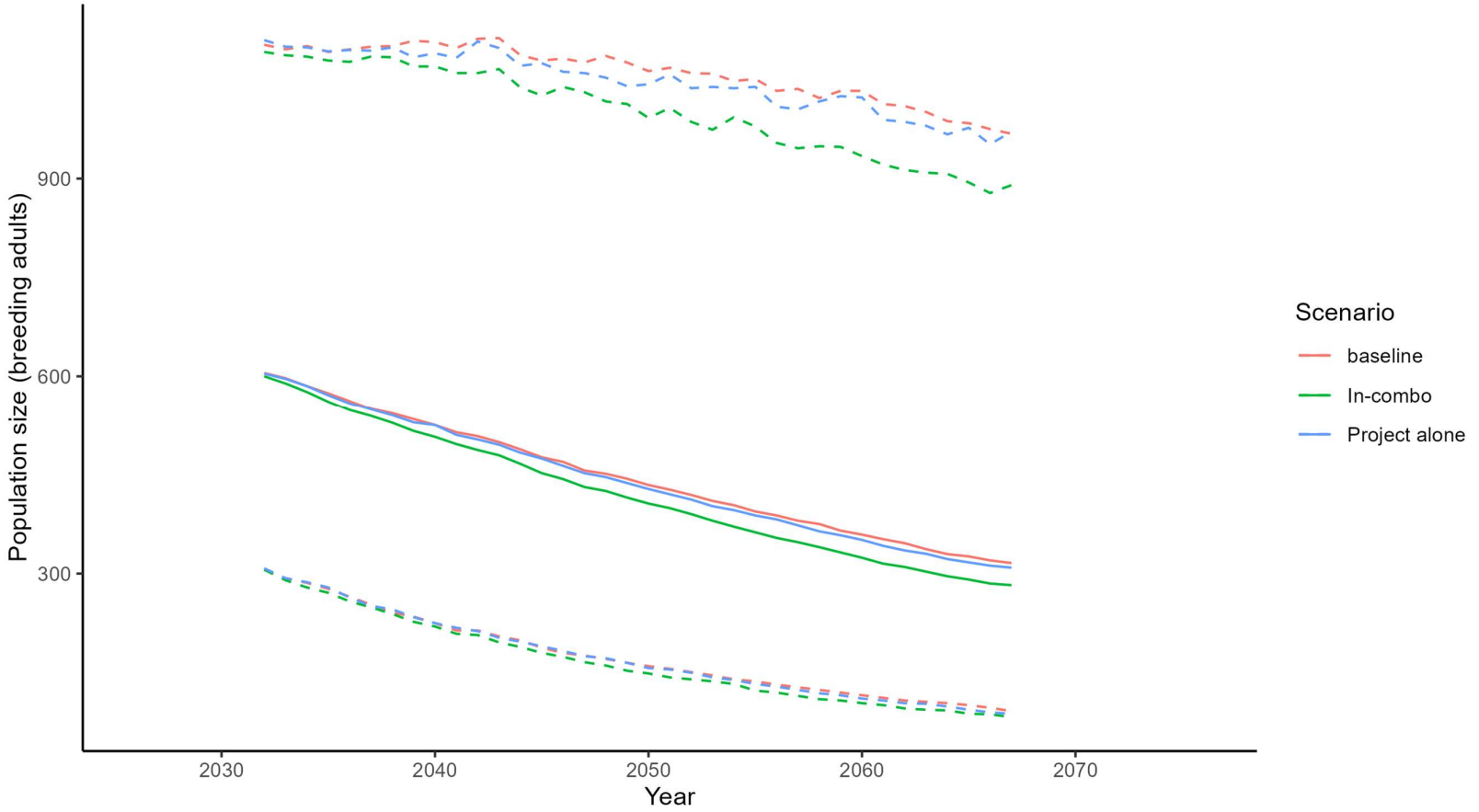

Figure 11. Kittiwake Ireland's Eye SPA, 30%, 1% with macroavoidance

Table 26. Inputs: Kittiwake Ireland's Eye SPA, 30%, 3% with macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Ireland's Eye	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	2030
Random seed	12	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0005985037
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.002581047
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	802		
Year	2016		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 27. Outputs: Kittiwake Ireland's Eye SPA, 30%, 3% with macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.5	0.0005985037	25	0.9994	0.9994	0.0048	0.9898	1.0089	0.9853	0.9930	0.1414	0.7440	1.3012	49.04	51.30
In-combo	2.1	0.0025810474	25	0.9970	0.9970	0.0048	0.9874	1.0069	0.9264	0.9329	0.1324	0.6967	1.2243	43.44	56.28
Project alone	0.5	0.0005985037	35	0.9993	0.9994	0.0044	0.9908	1.0084	0.9755	0.9906	0.1709	0.6910	1.3761	48.92	51.48
In-combo	2.1	0.0025810474	35	0.9969	0.9970	0.0044	0.9883	1.0059	0.8938	0.9082	0.1579	0.6377	1.2544	41.74	57.80

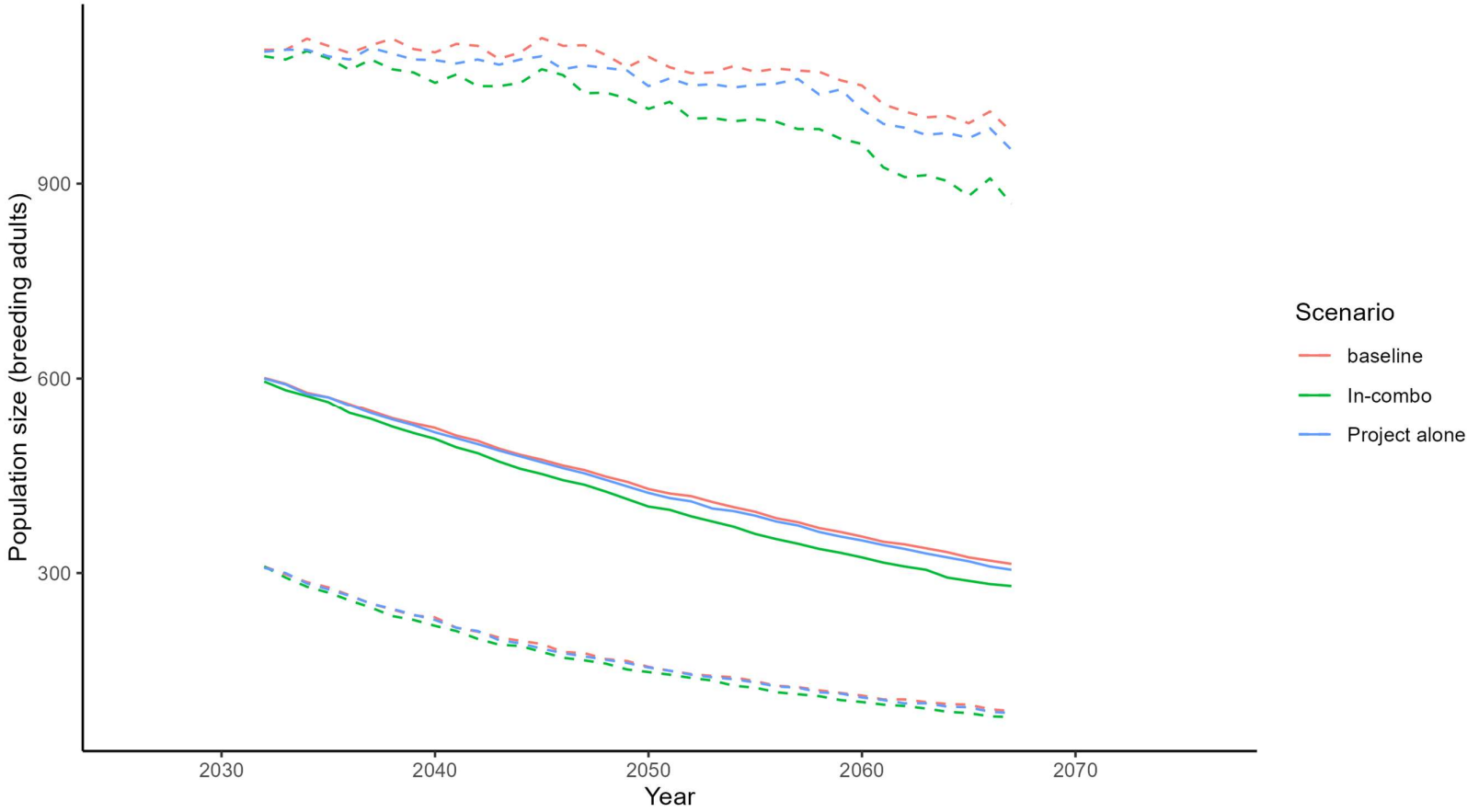

Figure 12. Kittiwake Ireland's Eye SPA, 30%, 3% with macroavoidance

Table 28. Inputs: Kittiwake Wicklow Head SPA, 30%, 1% without macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Wicklow Head	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	2030
Random seed	13	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0003115727
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.006364985
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	1348		
Year	2022		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 29. Outputs: Kittiwake Wicklow Head SPA, 30%, 1% without macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.4	0.0003115727	25	0.9997	0.9996	0.0035	0.9925	1.0066	0.9910	0.9938	0.0959	0.8155	1.1961	49.38	50.60
In-combo	8.6	0.0063649852	25	0.9924	0.9924	0.0036	0.9856	1.0000	0.8200	0.8250	0.0827	0.6758	1.0051	34.78	66.20
Project alone	0.4	0.0003115727	35	0.9996	0.9996	0.0031	0.9932	1.0058	0.9865	0.9923	0.1164	0.7762	1.2385	48.80	51.20
In-combo	8.6	0.0063649852	35	0.9925	0.9925	0.0032	0.9860	0.9988	0.7609	0.7672	0.0932	0.5975	0.9663	31.26	69.28

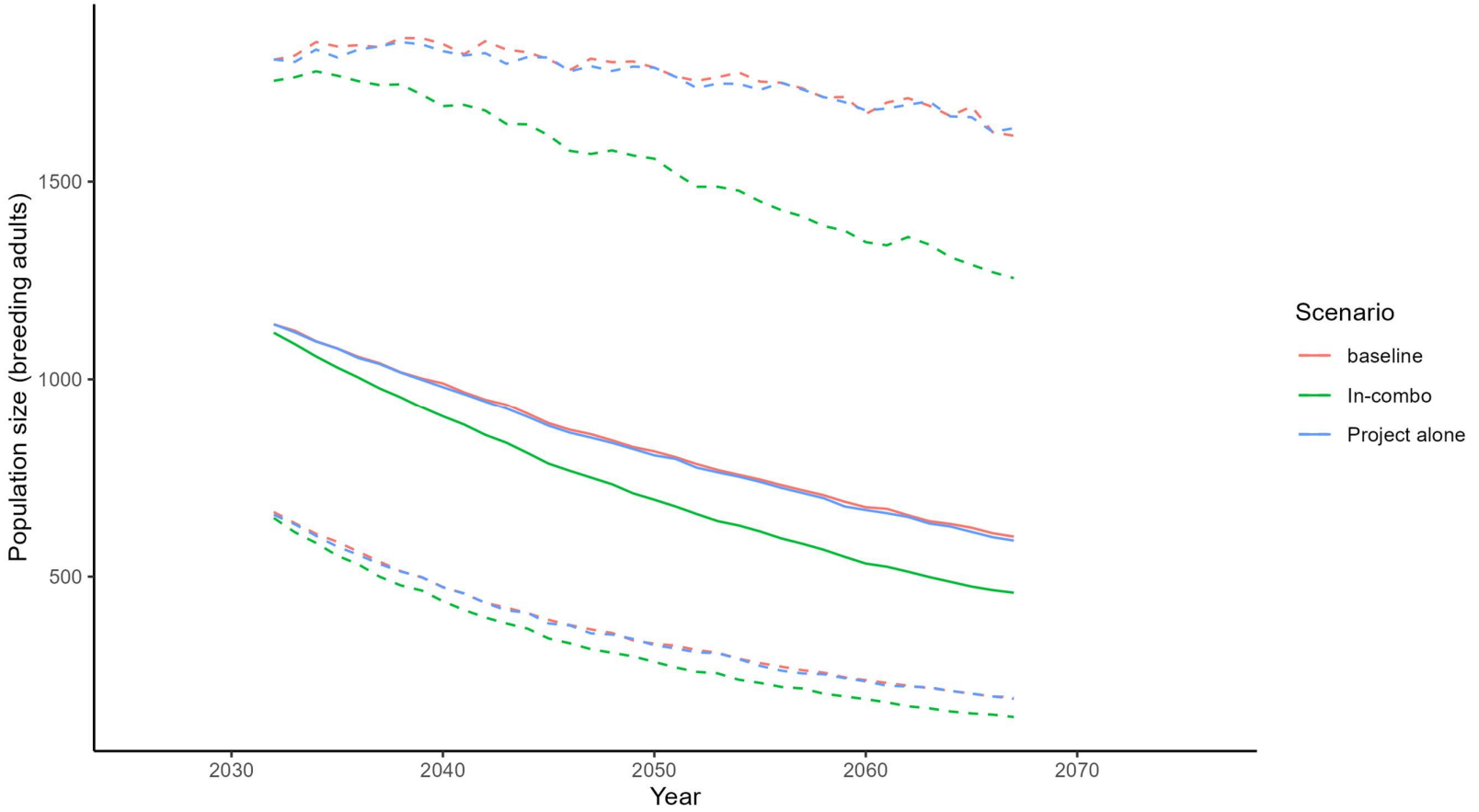

Figure 13. Kittiwake Wicklow Head SPA, 30%, 1% without macroavoidance

Table 30. Inputs: Kittiwake Wicklow Head SPA, 30%, 3% without macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Wicklow Head	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	2030
Random seed	14	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0003709199
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.006424332
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	1348		
Year	2022		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 31. Outputs: Kittiwake Wicklow Head SPA, 30%, 3% without macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.5	0.0003709199	25	0.9995	0.9995	0.0034	0.9926	1.0064	0.9868	0.9915	0.0949	0.8173	1.1897	48.64	50.94
In-combo	8.7	0.0064243323	25	0.9924	0.9923	0.0035	0.9852	0.9994	0.8195	0.8236	0.0820	0.6722	0.9951	33.64	67.22
Project alone	0.5	0.0003709199	35	0.9996	0.9996	0.0031	0.9936	1.0055	0.9855	0.9911	0.1155	0.7819	1.2350	49.42	50.72
In-combo	8.7	0.0064243323	35	0.9924	0.9924	0.0032	0.9859	0.9989	0.7598	0.7655	0.0946	0.5896	0.9688	31.26	68.78

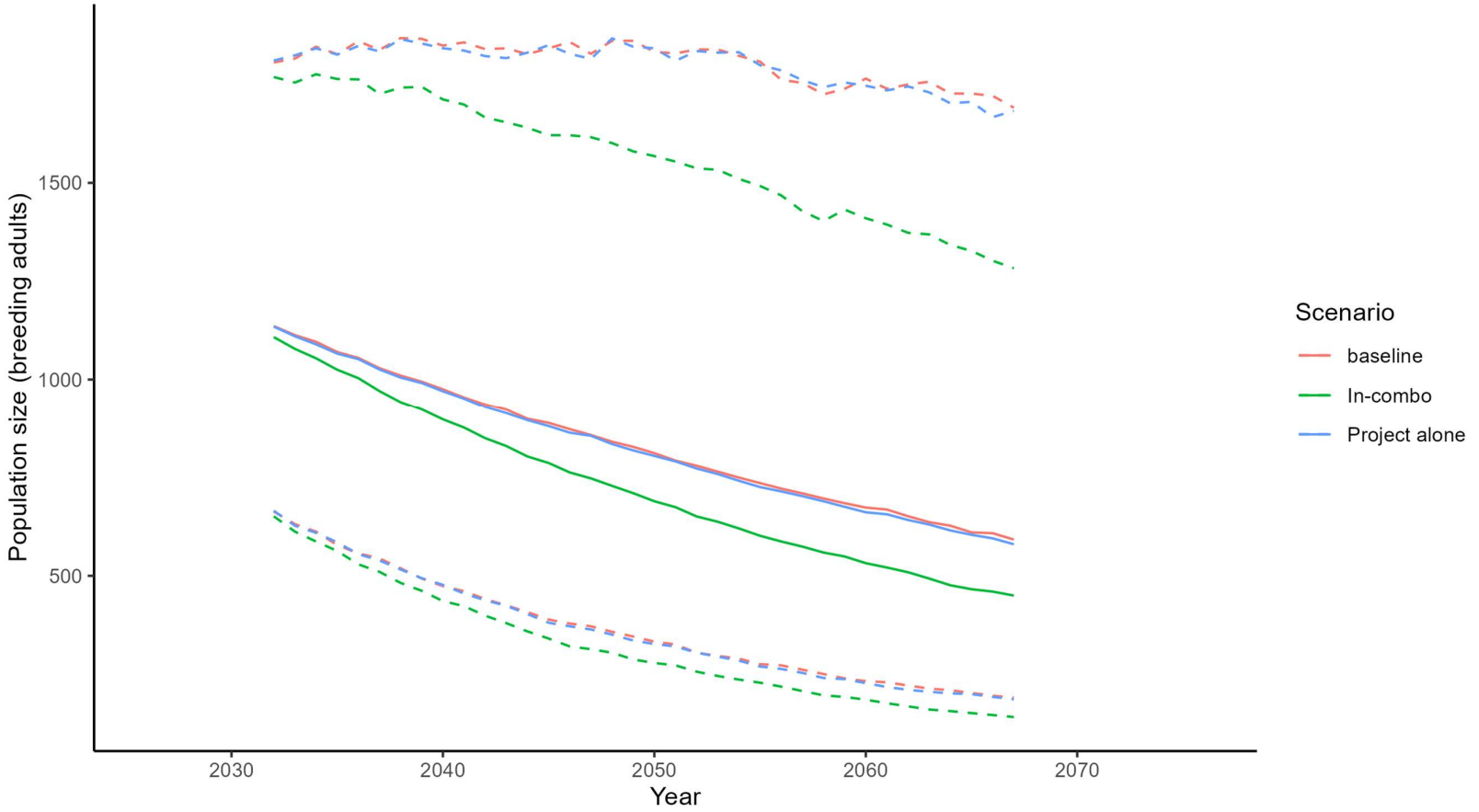

Figure 14. Kittiwake Wicklow Head SPA, 30%, 3% without macroavoidance

Table 32. Inputs: Kittiwake Wicklow Head SPA, 30%, 1% with macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Wicklow Head	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	2030
Random seed	15	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0002225519
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.006275964
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	1348		
Year	2022		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 33. Outputs: Kittiwake Wicklow Head SPA, 30%, 1% with macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.3	0.0002225519	25	0.9997	0.9997	0.0034	0.9929	1.0065	0.9948	0.9979	0.0954	0.8185	1.1972	49.46	50.42
In-combo	8.5	0.0062759644	25	0.9925	0.9926	0.0035	0.9855	0.9997	0.8231	0.8279	0.0821	0.6756	1.0058	34.70	66.48
Project alone	0.3	0.0002225519	35	0.9997	0.9998	0.0031	0.9936	1.0059	0.9912	0.9979	0.1159	0.7827	1.2422	49.40	50.66
In-combo	8.5	0.0062759644	35	0.9925	0.9926	0.0032	0.9860	0.9988	0.7639	0.7697	0.0931	0.5989	0.9694	31.18	69.72

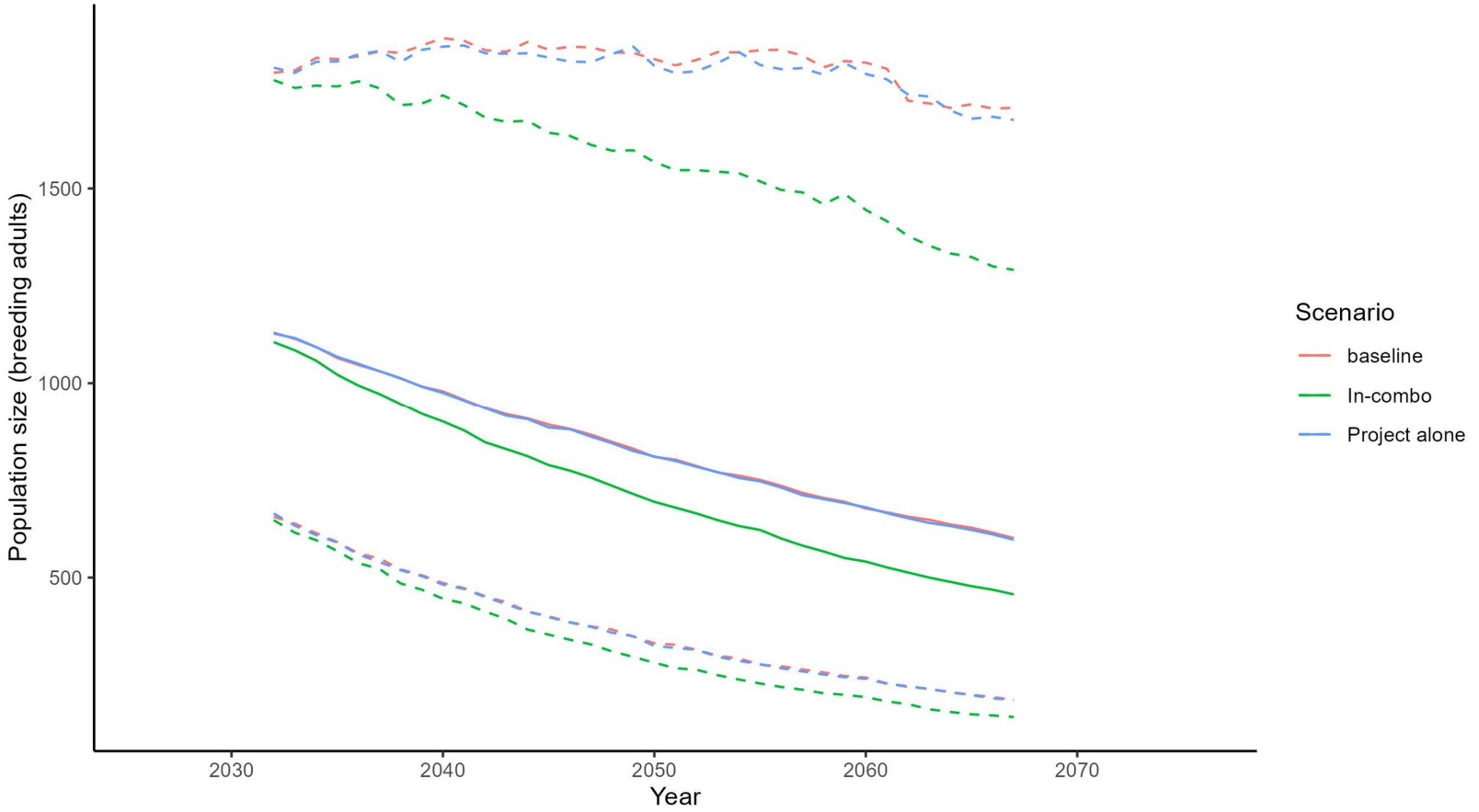

Figure 15. Kittiwake Wicklow Head SPA, 30%, 1% with macroavoidance

Table 34. Inputs: Kittiwake Wicklow Head SPA, 30%, 3% with macroavoidance

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ki Wicklow Head	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	2030
Random seed	16	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Black-legged	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0002893175
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	4	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.00634273
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	1348		
Year	2022		
Productivity rate per pair mean	0.5084217		
Productivity rate per pair standard deviation	0.2898223		
Adult survival rate Mean	0.854		
Adult survival rate standard deviation	0.077		
Immatures survival rates 0 to 1 mean	0.79		
Immatures survival rates 0 to 1 standard deviation	0.077		
Immatures survival rates 1 to 2 mean	0.854		
Immatures survival rates 1 to 2 standard deviation	0.077		
Immatures survival rates 2 to 3 mean	0.854		
Immatures survival rates 2 to 3 standard deviation	0.077		
Immatures survival rates 3 to 4 mean	0.853999999999		
Immatures survival rates 3 to 4 standard deviation	7.699999999999		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 35. Outputs: Kittiwake Wicklow Head SPA, 30%, 3% with macroavoidance

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.4	0.0002893175	25	0.9997	0.9997	0.0035	0.9928	1.0069	0.9920	0.9967	0.0966	0.8232	1.2051	49.38	50.96
In-combo	8.6	0.0063427300	25	0.9924	0.9924	0.0036	0.9853	0.9994	0.8201	0.8241	0.0819	0.6730	0.9961	33.48	66.54
Project alone	0.4	0.0002893175	35	0.9997	0.9997	0.0031	0.9937	1.0059	0.9882	0.9953	0.1171	0.7883	1.2536	49.32	51.12
In-combo	8.6	0.0063427300	35	0.9924	0.9924	0.0033	0.9858	0.9989	0.7601	0.7655	0.0942	0.5963	0.9655	30.40	69.94

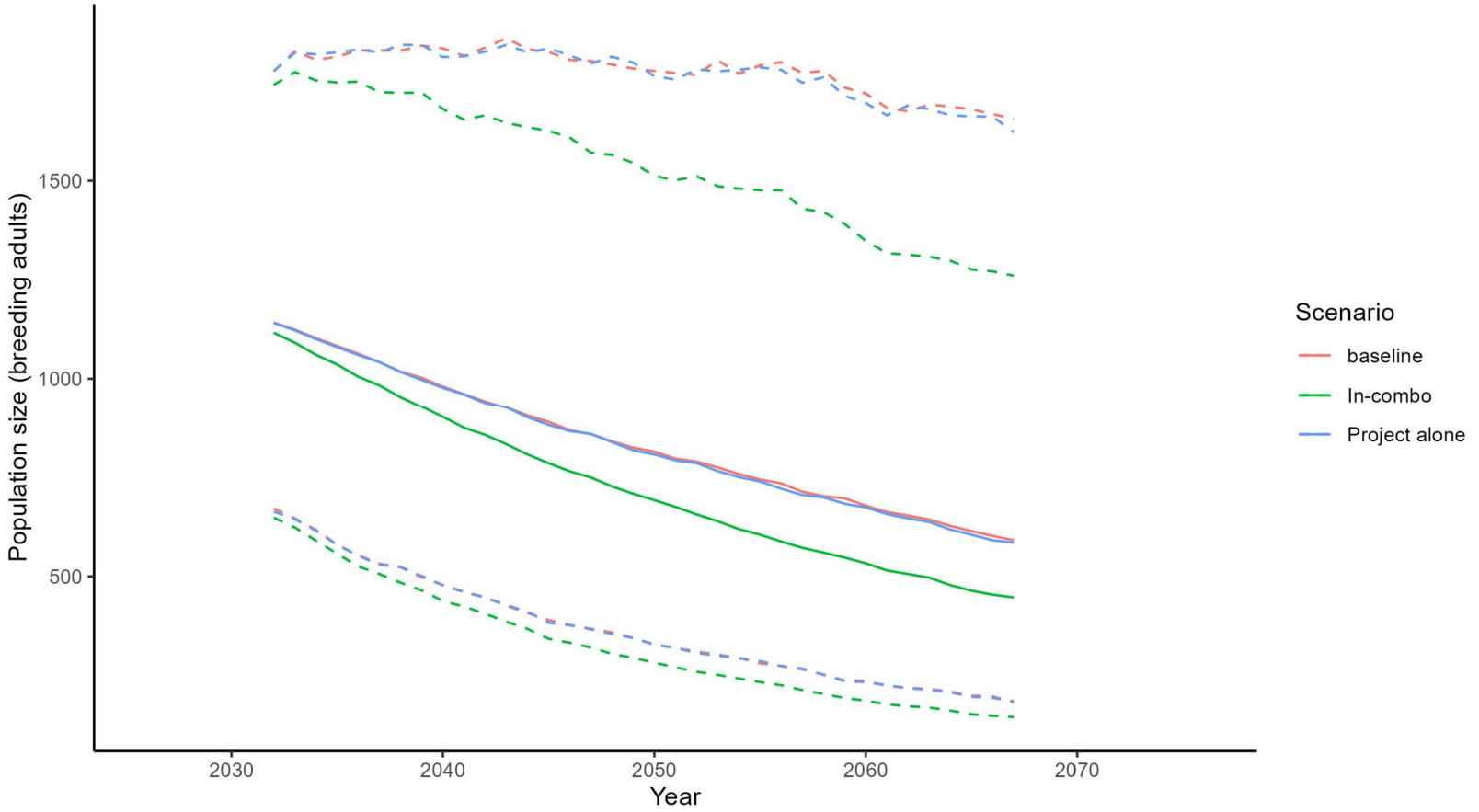

Figure 16. Kittiwake Wicklow Head SPA, 30%, 3% with macroavoidance

Table 36. Inputs: Guillemot Ireland's Eye SPA 50%, 1%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Gu Ireland's Eye	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	2030
Random seed	17	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Common	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.001201814
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	6	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.002247166
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	4410		
Year	2015		
Productivity rate per pair mean	0.5489978		
Productivity rate per pair standard deviation	0.2939644		
Adult survival rate Mean	0.94		
Adult survival rate standard deviation	0.025		
Immatures survival rates 0 to 1 mean	0.56		
Immatures survival rates 0 to 1 standard deviation	0.058		
Immatures survival rates 1 to 2 mean	0.792		
Immatures survival rates 1 to 2 standard deviation	0.152		
Immatures survival rates 2 to 3 mean	0.917		
Immatures survival rates 2 to 3 standard deviation	0.098		
Immatures survival rates 3 to 4 mean	0.937999999999		
Immatures survival rates 3 to 4 standard deviation	0.107		
Immatures survival rates 4 to 5 mean	0.94		
Units for output	breeding.adults		

Table 37. Outputs: Guillemot Ireland's Eye SPA 50%, 1%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	5.3	0.001201814	25	0.9987	0.9987	0.0008	0.9972	1.0003	0.9659	0.9665	0.0255	0.9178	1.0182	44.78	55.54
In-combo	9.9	0.002247166	25	0.9975	0.9975	0.0008	0.9959	0.9991	0.9373	0.9374	0.0252	0.8878	0.9861	39.98	60.48
Project alone	5.3	0.001201814	35	0.9987	0.9987	0.0006	0.9975	1.0000	0.9531	0.9538	0.0268	0.9019	1.0075	43.04	56.56
In-combo	9.9	0.002247166	35	0.9975	0.9975	0.0007	0.9962	0.9988	0.9138	0.9141	0.0264	0.8622	0.9664	37.02	63.12

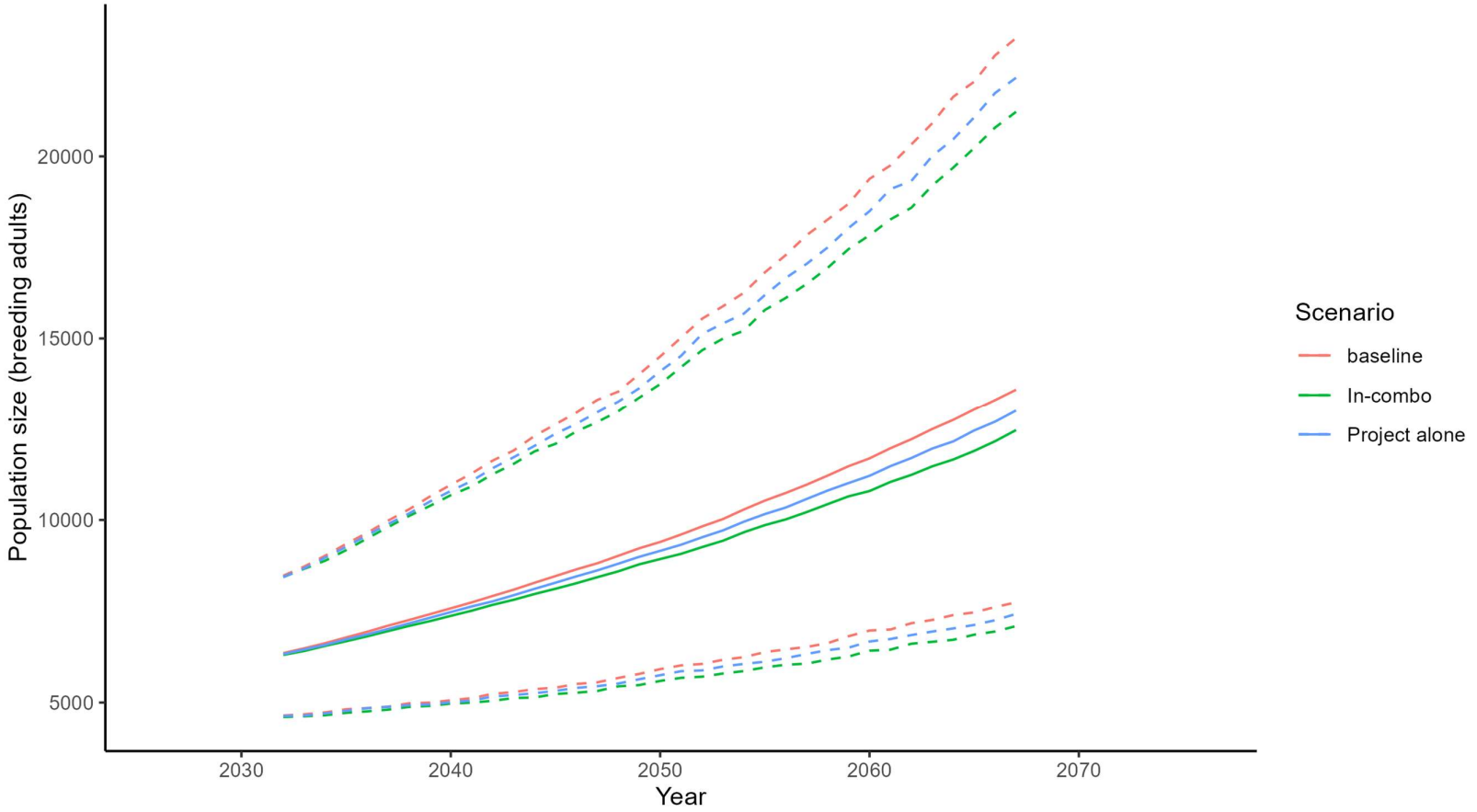

Figure 17. Guillemot Ireland's Eye SPA 50%, 1%

Table 38. Inputs: Guillemot Ireland's Eye SPA 70%, 2%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Gu Ireland's Eye	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	2030
Random seed	18	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Common	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.003362812
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	6	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.006294785
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	4410		
Year	2015		
Productivity rate per pair mean	0.5489978		
Productivity rate per pair standard deviation	0.2939644		
Adult survival rate Mean	0.94		
Adult survival rate standard deviation	0.025		
Immatures survival rates 0 to 1 mean	0.56		
Immatures survival rates 0 to 1 standard deviation	0.058		
Immatures survival rates 1 to 2 mean	0.792		
Immatures survival rates 1 to 2 standard deviation	0.152		
Immatures survival rates 2 to 3 mean	0.917		
Immatures survival rates 2 to 3 standard deviation	0.098		
Immatures survival rates 3 to 4 mean	0.937999999999		
Immatures survival rates 3 to 4 standard deviation	0.107		
Immatures survival rates 4 to 5 mean	0.94		
Units for output	breeding.adults		

Table 39. Outputs: Guillemot Ireland's Eye SPA 70%, 2%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	14.8	0.003362812	25	0.9962	0.9963	0.0008	0.9947	0.9978	0.9075	0.9076	0.0241	0.8614	0.9545	34.78	65.86
In-combo	27.8	0.006294785	25	0.9930	0.9930	0.0008	0.9915	0.9946	0.8335	0.8340	0.0223	0.7915	0.8788	23.48	78.06
Project alone	14.8	0.003362812	35	0.9962	0.9962	0.0007	0.9950	0.9975	0.8732	0.8738	0.0250	0.8258	0.9225	31.38	69.02
In-combo	27.8	0.006294785	35	0.9930	0.9930	0.0007	0.9917	0.9943	0.7765	0.7771	0.0224	0.7335	0.8217	18.76	82.92

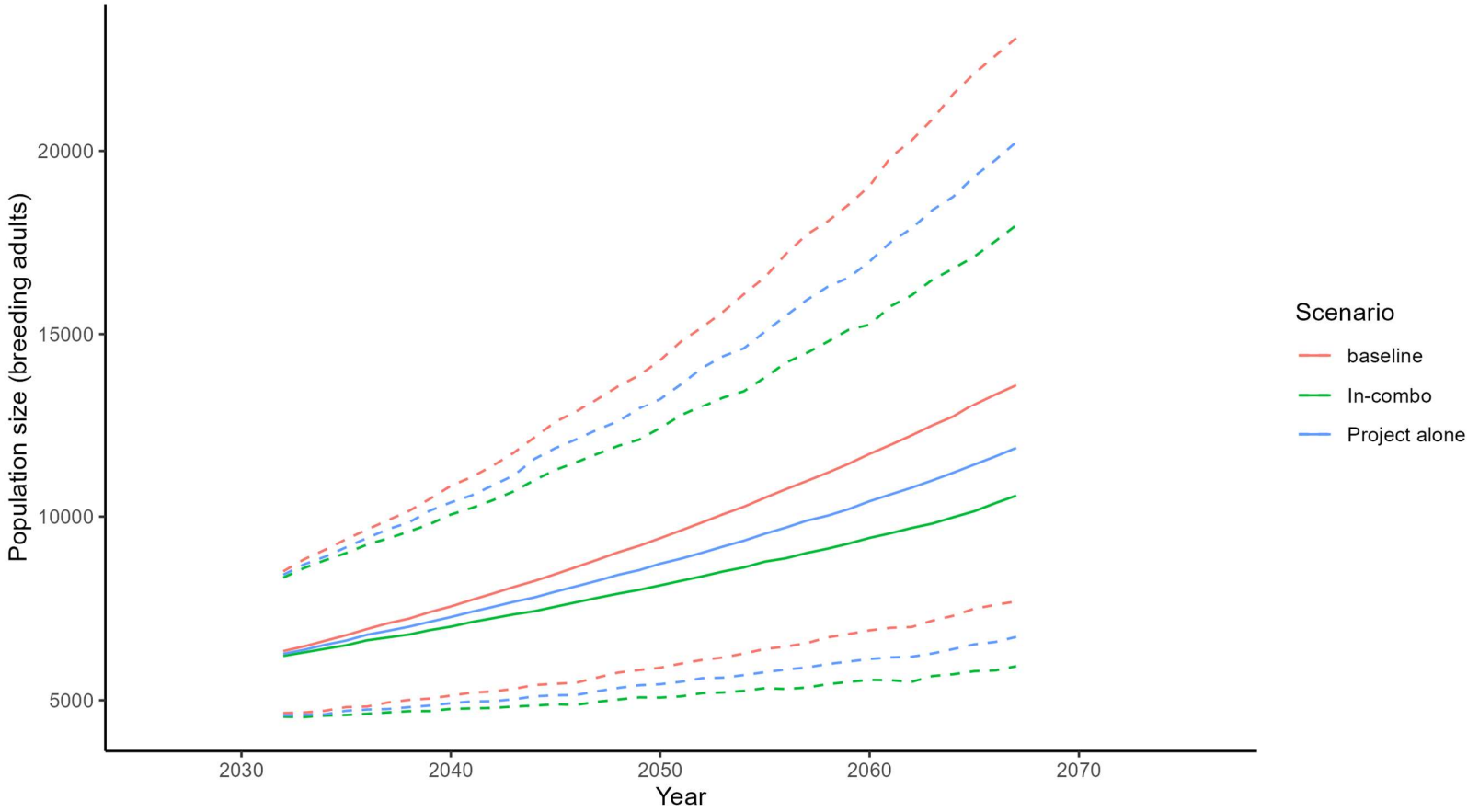

Figure 18. Guillemot Ireland's Eye SPA 70%, 2%

Table 40. Inputs: Guillemot Ireland's Eye SPA 60%, 1 and 3%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Gu Ireland's Eye	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	2030
Random seed	19	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Common	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.004306122
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	6	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.007206349
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	4410		
Year	2015		
Productivity rate per pair mean	0.5489978		
Productivity rate per pair standard deviation	0.2939644		
Adult survival rate Mean	0.94		
Adult survival rate standard deviation	0.025		
Immatures survival rates 0 to 1 mean	0.56		
Immatures survival rates 0 to 1 standard deviation	0.058		
Immatures survival rates 1 to 2 mean	0.792		
Immatures survival rates 1 to 2 standard deviation	0.152		
Immatures survival rates 2 to 3 mean	0.917		
Immatures survival rates 2 to 3 standard deviation	0.098		
Immatures survival rates 3 to 4 mean	0.937999999999		
Immatures survival rates 3 to 4 standard deviation	0.107		
Immatures survival rates 4 to 5 mean	0.94		
Units for output	breeding.adults		

Table 41. Outputs: Guillemot Ireland's Eye SPA 60%, 1 and 3%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	19.0	0.004306122	25	0.9952	0.9952	0.0008	0.9936	0.9968	0.8829	0.8830	0.0235	0.8375	0.9298	30.10	69.02
In-combo	31.8	0.007206349	25	0.9920	0.9920	0.0008	0.9903	0.9936	0.8116	0.8120	0.0217	0.7696	0.8552	20.14	79.78
Project alone	19.0	0.004306122	35	0.9952	0.9952	0.0007	0.9939	0.9965	0.8412	0.8415	0.0242	0.7946	0.8904	26.10	73.04
In-combo	31.8	0.007206349	35	0.9920	0.9920	0.0007	0.9907	0.9933	0.7485	0.7488	0.0215	0.7073	0.7913	14.42	84.62

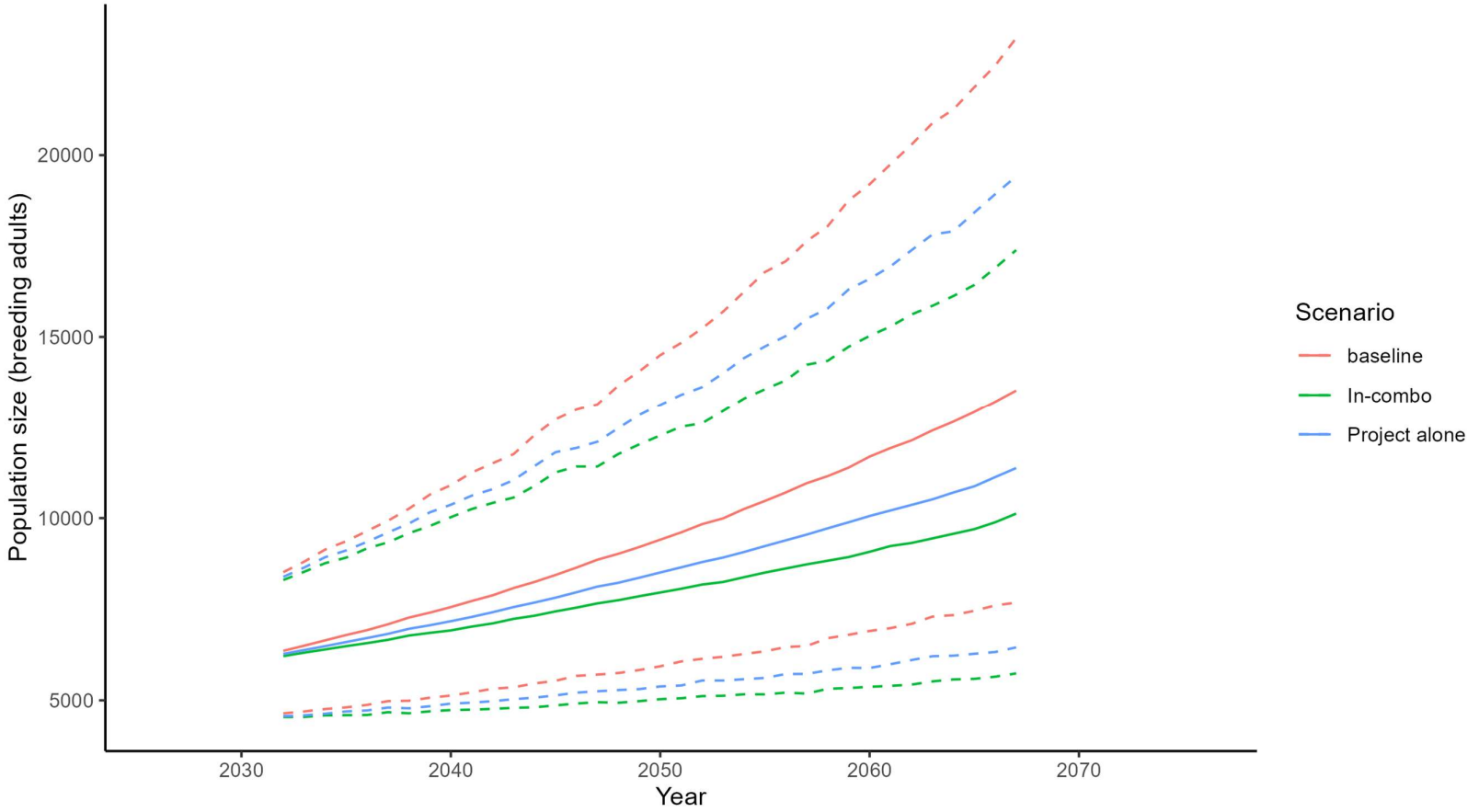

Figure 19. Guillemot Ireland's Eye SPA 60%, 1 and 3%

Table 42. Inputs: Guillemot Ireland's Eye SPA 60%, 3 and 5%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Gu Ireland's Eye	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	2030
Random seed	20	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Common	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.007188209
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	6	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.01260091
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	4410		
Year	2015		
Productivity rate per pair mean	0.5489978		
Productivity rate per pair standard deviation	0.2939644		
Adult survival rate Mean	0.94		
Adult survival rate standard deviation	0.025		
Immatures survival rates 0 to 1 mean	0.56		
Immatures survival rates 0 to 1 standard deviation	0.058		
Immatures survival rates 1 to 2 mean	0.792		
Immatures survival rates 1 to 2 standard deviation	0.152		
Immatures survival rates 2 to 3 mean	0.917		
Immatures survival rates 2 to 3 standard deviation	0.098		
Immatures survival rates 3 to 4 mean	0.937999999999		
Immatures survival rates 3 to 4 standard deviation	0.107		
Immatures survival rates 4 to 5 mean	0.94		
Units for output	breeding.adults		

Table 43. Outputs: Guillemot Ireland's Eye SPA 60%, 3 and 5%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	31.7	0.007188209	25	0.992	0.992	0.0008	0.9904	0.9936	0.8115	0.8119	0.0222	0.7700	0.8566	20.44	81.10
In-combo	55.6	0.012600907	25	0.986	0.986	0.0009	0.9843	0.9877	0.6930	0.6932	0.0192	0.6561	0.7304	7.40	94.16
Project alone	31.7	0.007188209	35	0.992	0.992	0.0007	0.9906	0.9933	0.7484	0.7486	0.0221	0.7069	0.7933	14.64	85.60
In-combo	55.6	0.012600907	35	0.986	0.986	0.0007	0.9846	0.9873	0.6012	0.6014	0.0180	0.5670	0.6374	3.74	97.06

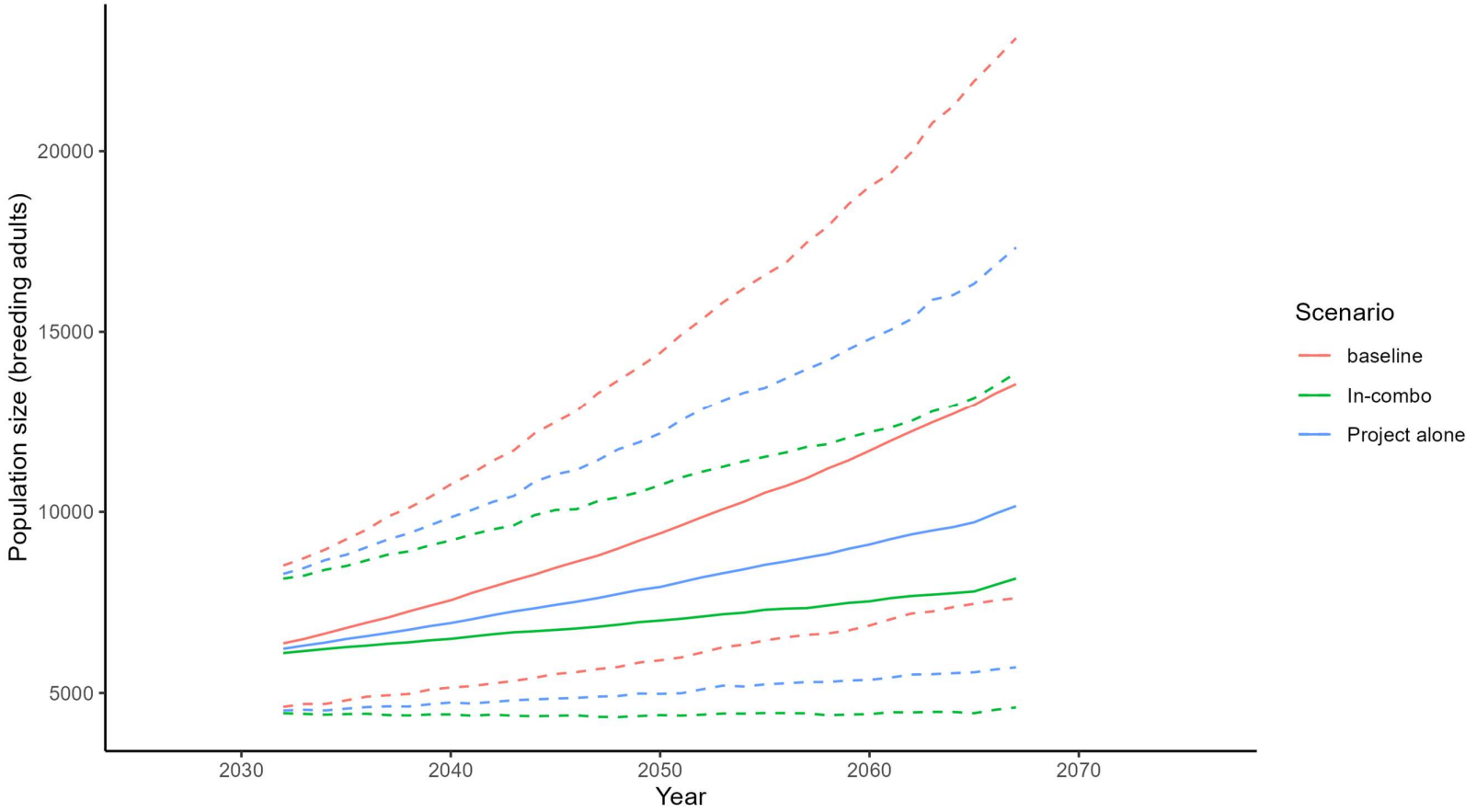

Figure 20. Guillemot Ireland's Eye SPA 60%, 3 and 5%

Table 44. Inputs: Guillemot Lambay Island SPA 50%, 1%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Gu Lambay SPA	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	2030
Random seed	21	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Common	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.000610673
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	6	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.001735158
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	59983		
Year	2015		
Productivity rate per pair mean	0.5489978		
Productivity rate per pair standard deviation	0.2939644		
Adult survival rate Mean	0.94		
Adult survival rate standard deviation	0.025		
Immatures survival rates 0 to 1 mean	0.56		
Immatures survival rates 0 to 1 standard deviation	0.058		
Immatures survival rates 1 to 2 mean	0.792		
Immatures survival rates 1 to 2 standard deviation	0.152		
Immatures survival rates 2 to 3 mean	0.917		
Immatures survival rates 2 to 3 standard deviation	0.098		
Immatures survival rates 3 to 4 mean	0.937999999999		
Immatures survival rates 3 to 4 standard deviation	0.107		
Immatures survival rates 4 to 5 mean	0.94		
Units for output	breeding.adults		

Table 45. Outputs: Guillemot Lambay Island SPA 50%, 1%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	36.6	0.000610673	25	0.9993	0.9993	0.0002	0.9989	0.9998	0.9826	0.9825	0.0070	0.9690	0.9964	47.24	52.38
In-combo	104.1	0.001735158	25	0.9981	0.9981	0.0002	0.9976	0.9985	0.9511	0.9512	0.0069	0.9373	0.9647	41.94	58.04
Project alone	36.6	0.000610673	35	0.9993	0.9993	0.0002	0.9990	0.9997	0.9759	0.9759	0.0075	0.9615	0.9909	46.80	53.24
In-combo	104.1	0.001735158	35	0.9981	0.9981	0.0002	0.9977	0.9984	0.9330	0.9329	0.0072	0.9190	0.9474	40.44	59.60

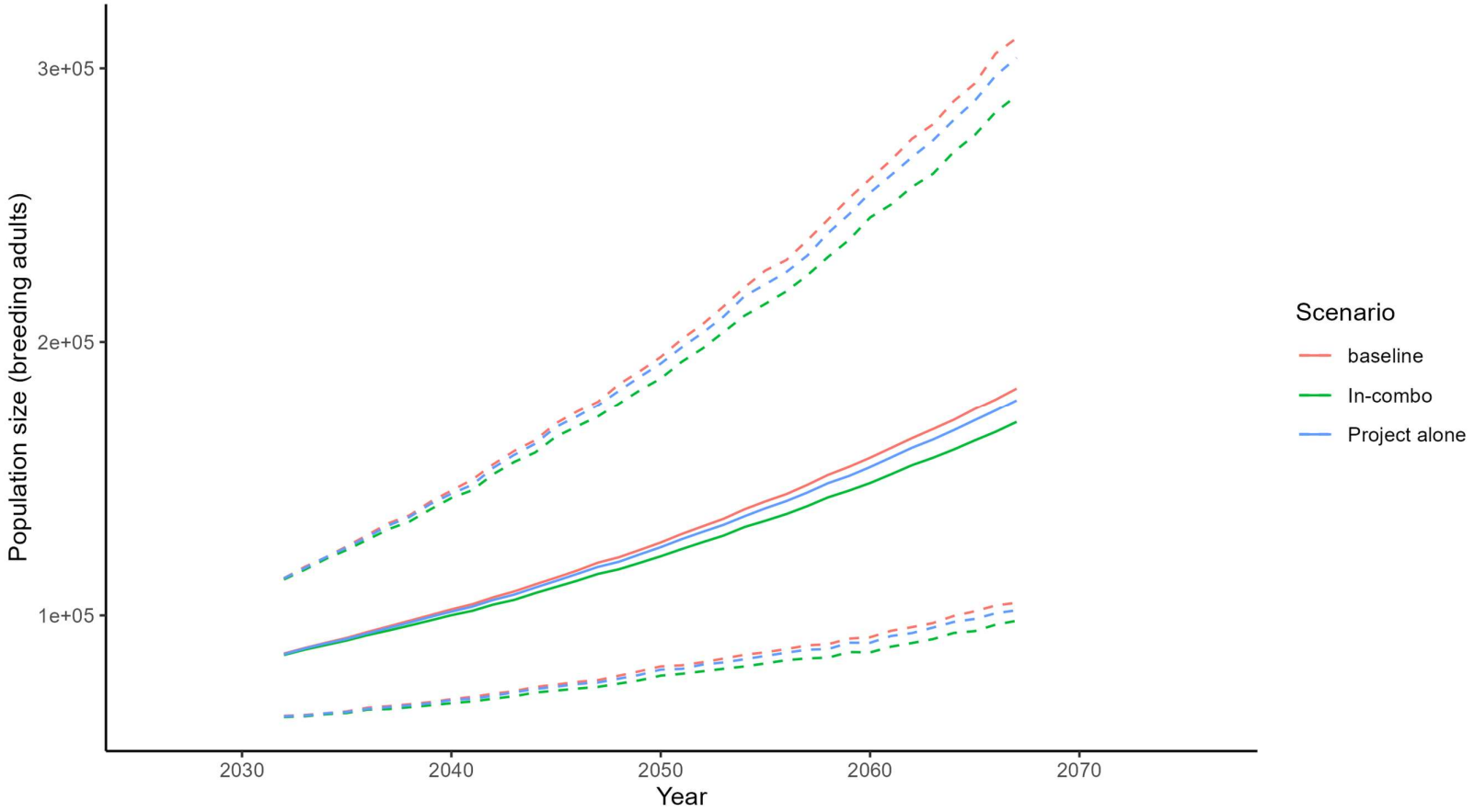

Figure 21. Guillemot Lambay Island SPA 50%, 1%

Table 46. Inputs: Guillemot Lambay Island SPA 70%, 2%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Gu Lambay SPA	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	2030
Random seed	22	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Common	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.001709818
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	6	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.004858543
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	59983		
Year	2015		
Productivity rate per pair mean	0.5489978		
Productivity rate per pair standard deviation	0.2939644		
Adult survival rate Mean	0.94		
Adult survival rate standard deviation	0.025		
Immatures survival rates 0 to 1 mean	0.56		
Immatures survival rates 0 to 1 standard deviation	0.058		
Immatures survival rates 1 to 2 mean	0.792		
Immatures survival rates 1 to 2 standard deviation	0.152		
Immatures survival rates 2 to 3 mean	0.917		
Immatures survival rates 2 to 3 standard deviation	0.098		
Immatures survival rates 3 to 4 mean	0.937999999999		
Immatures survival rates 3 to 4 standard deviation	0.107		
Immatures survival rates 4 to 5 mean	0.94		
Units for output	breeding.adults		

Table 47. Outputs: Guillemot Lambay Island SPA 70%, 2%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	102.6	0.001709818	25	0.9981	0.9981	0.0002	0.9977	0.9985	0.9516	0.9517	0.0068	0.9385	0.9648	41.46	58.74
In-combo	291.4	0.004858543	25	0.9946	0.9946	0.0002	0.9942	0.9950	0.8687	0.8688	0.0062	0.8567	0.8811	28.16	72.40
Project alone	102.6	0.001709818	35	0.9981	0.9981	0.0002	0.9978	0.9984	0.9336	0.9336	0.0071	0.9201	0.9478	40.16	59.78
In-combo	291.4	0.004858543	35	0.9946	0.9946	0.0002	0.9943	0.9950	0.8226	0.8227	0.0064	0.8106	0.8356	24.28	76.00

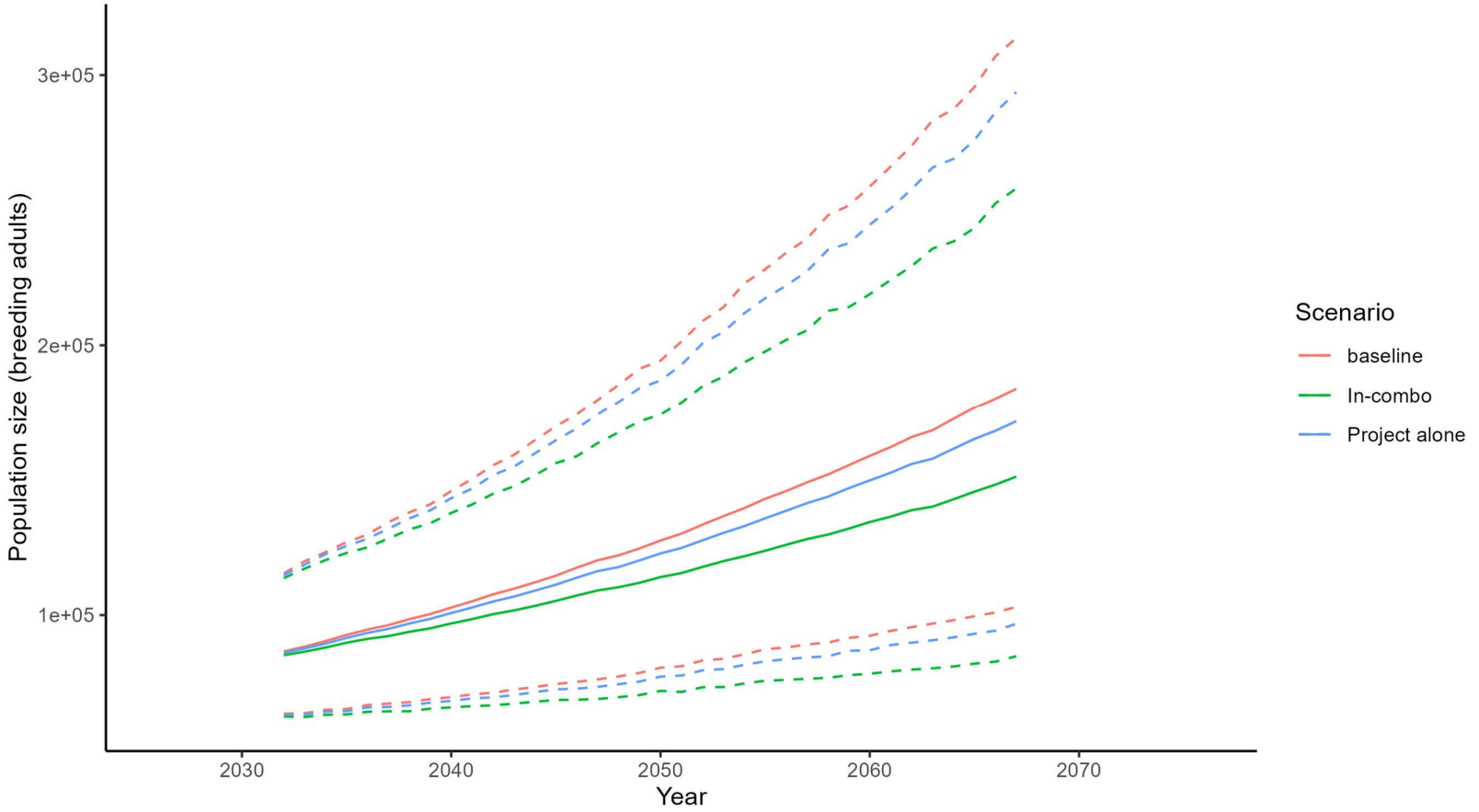

Figure 22. Guillemot Lambay Island SPA 70%, 2%

Table 48. Inputs: Guillemot Lambay Island SPA 60%, 1 and 3%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Gu Lambay SPA	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	2030
Random seed	23	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Common	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.002179784
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	6	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.005279996
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	59983		
Year	2015		
Productivity rate per pair mean	0.5489978		
Productivity rate per pair standard deviation	0.2939644		
Adult survival rate Mean	0.94		
Adult survival rate standard deviation	0.025		
Immatures survival rates 0 to 1 mean	0.56		
Immatures survival rates 0 to 1 standard deviation	0.058		
Immatures survival rates 1 to 2 mean	0.792		
Immatures survival rates 1 to 2 standard deviation	0.152		
Immatures survival rates 2 to 3 mean	0.917		
Immatures survival rates 2 to 3 standard deviation	0.098		
Immatures survival rates 3 to 4 mean	0.937999999999		
Immatures survival rates 3 to 4 standard deviation	0.107		
Immatures survival rates 4 to 5 mean	0.94		
Units for output	breeding.adults		

Table 49. Outputs: Guillemot Lambay Island SPA 60%, 1 and 3%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	130.8	0.002179784	25	0.9976	0.9976	0.0002	0.9972	0.9980	0.9390	0.9390	0.0067	0.9255	0.9522	40.80	59.88
In-combo	316.7	0.005279996	25	0.9941	0.9941	0.0002	0.9937	0.9946	0.8582	0.8582	0.0063	0.8458	0.8710	27.10	73.96
Project alone	130.8	0.002179784	35	0.9976	0.9976	0.0002	0.9972	0.9979	0.9164	0.9163	0.0071	0.9023	0.9300	37.58	62.52
In-combo	316.7	0.005279996	35	0.9941	0.9941	0.0002	0.9938	0.9945	0.8089	0.8088	0.0064	0.7964	0.8212	22.28	77.86

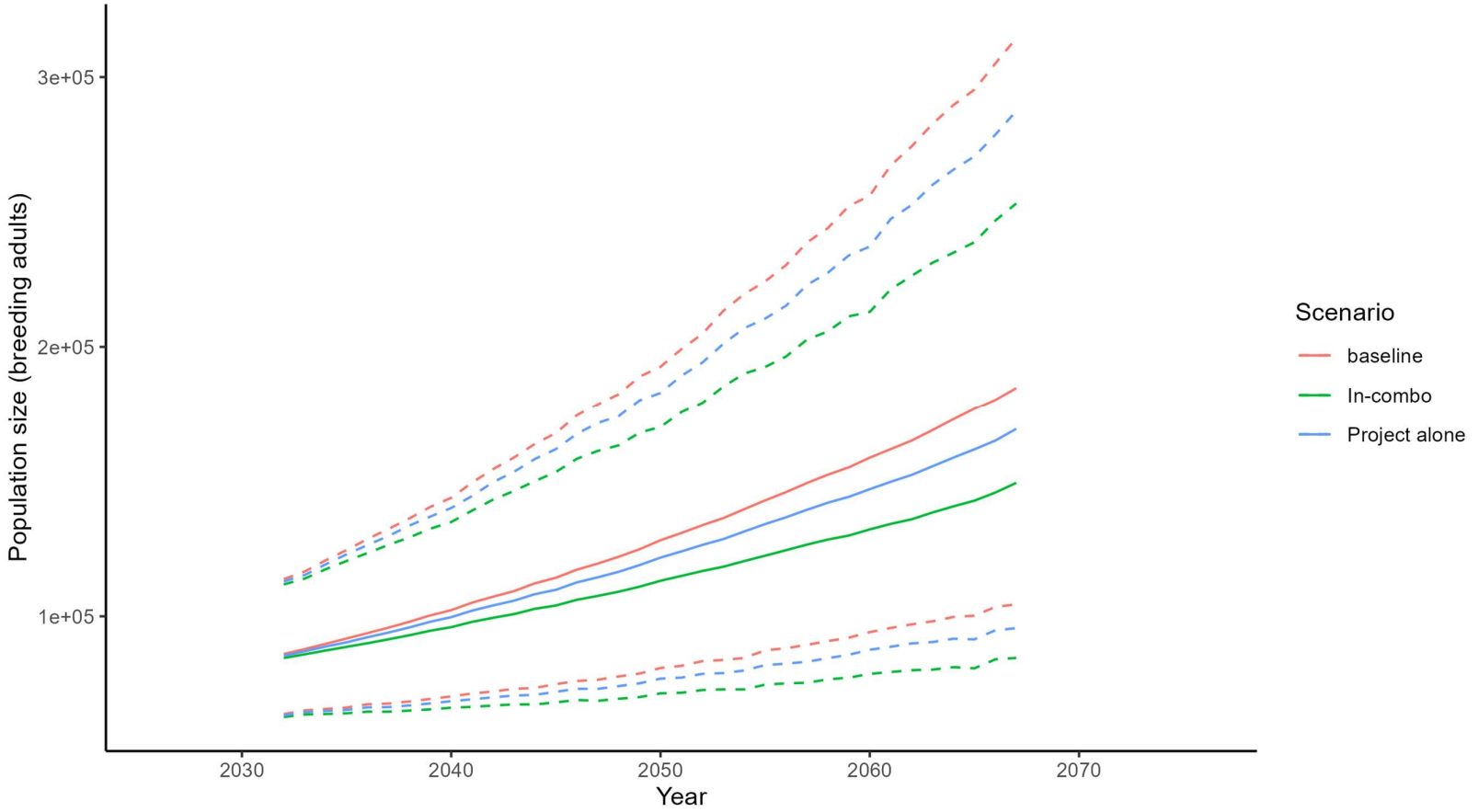

Figure 23. Guillemot Lambay Island SPA 60%, 1 and 3%

Table 50. Inputs: Guillemot Lambay Island SPA 60%, 3 and 5%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Gu Lambay SPA	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	2030
Random seed	24	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Common	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.003646033
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	6	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.009444343
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	59983		
Year	2015		
Productivity rate per pair mean	0.5489978		
Productivity rate per pair standard deviation	0.2939644		
Adult survival rate Mean	0.94		
Adult survival rate standard deviation	0.025		
Immatures survival rates 0 to 1 mean	0.56		
Immatures survival rates 0 to 1 standard deviation	0.058		
Immatures survival rates 1 to 2 mean	0.792		
Immatures survival rates 1 to 2 standard deviation	0.152		
Immatures survival rates 2 to 3 mean	0.917		
Immatures survival rates 2 to 3 standard deviation	0.098		
Immatures survival rates 3 to 4 mean	0.937999999999		
Immatures survival rates 3 to 4 standard deviation	0.107		
Immatures survival rates 4 to 5 mean	0.94		
Units for output	breeding.adults		

Table 51. Outputs: Guillemot Lambay Island SPA 60%, 3 and 5%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	218.7	0.003646033	25	0.9960	0.9960	0.0002	0.9955	0.9964	0.8998	0.8999	0.0065	0.8871	0.9127	32.78	66.82
In-combo	566.5	0.009444343	25	0.9895	0.9895	0.0002	0.9891	0.9900	0.7602	0.7602	0.0057	0.7486	0.7713	12.80	87.30
Project alone	218.7	0.003646033	35	0.9959	0.9959	0.0002	0.9956	0.9963	0.8638	0.8638	0.0068	0.8507	0.8773	29.32	70.82
In-combo	566.5	0.009444343	35	0.9895	0.9895	0.0002	0.9891	0.9899	0.6836	0.6836	0.0056	0.6721	0.6944	8.16	92.30

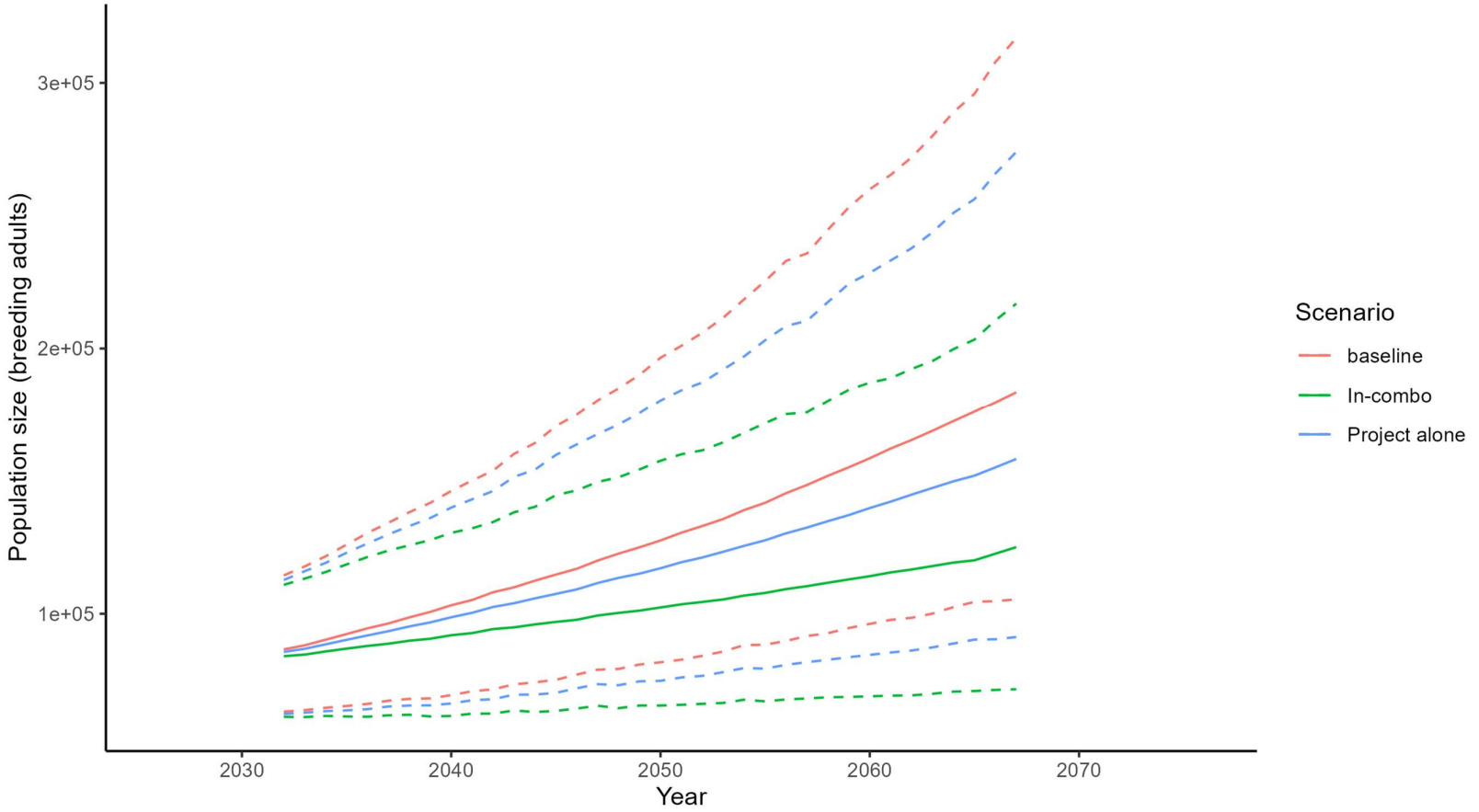

Figure 24. Guillemot Lambay Island SPA 60%, 3 and 5%

Table 52. Inputs: Razorbill Ireland's Eye SPA 50%, 1%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ra Ireland's Eye	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	2030
Random seed	25	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Razorbill	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.00045625
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.00126875
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	1600		
Year	2015		
Productivity rate per pair mean	0.5378833		
Productivity rate per pair standard deviation	0.2026453		
Adult survival rate Mean	0.895		
Adult survival rate standard deviation	0.067		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.067		
Immatures survival rates 1 to 2 mean	0.794		
Immatures survival rates 1 to 2 standard deviation	0.067		
Immatures survival rates 2 to 3 mean	0.895		
Immatures survival rates 2 to 3 standard deviation	0.067		
Immatures survival rates 3 to 4 mean	0.895000000000		
Immatures survival rates 3 to 4 standard deviation	6.700000000000		
Immatures survival rates 4 to 5 mean	0.895000000000		
Units for output	breeding.adults		

Table 53. Outputs: Razorbill Ireland's Eye SPA 50%, 1%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.7	0.00045625	25	0.9994	0.9995	0.0019	0.9958	1.0031	0.9868	0.9880	0.0592	0.8748	1.1114	48.14	51.90
In-combo	2.0	0.00126875	25	0.9985	0.9986	0.0019	0.9949	1.0024	0.9623	0.9651	0.0582	0.8572	1.0884	45.36	54.80
Project alone	0.7	0.00045625	35	0.9995	0.9995	0.0016	0.9964	1.0025	0.9807	0.9828	0.0647	0.8614	1.1151	48.00	52.22
In-combo	2.0	0.00126875	35	0.9986	0.9986	0.0016	0.9955	1.0017	0.9489	0.9512	0.0627	0.8363	1.0829	44.72	55.08

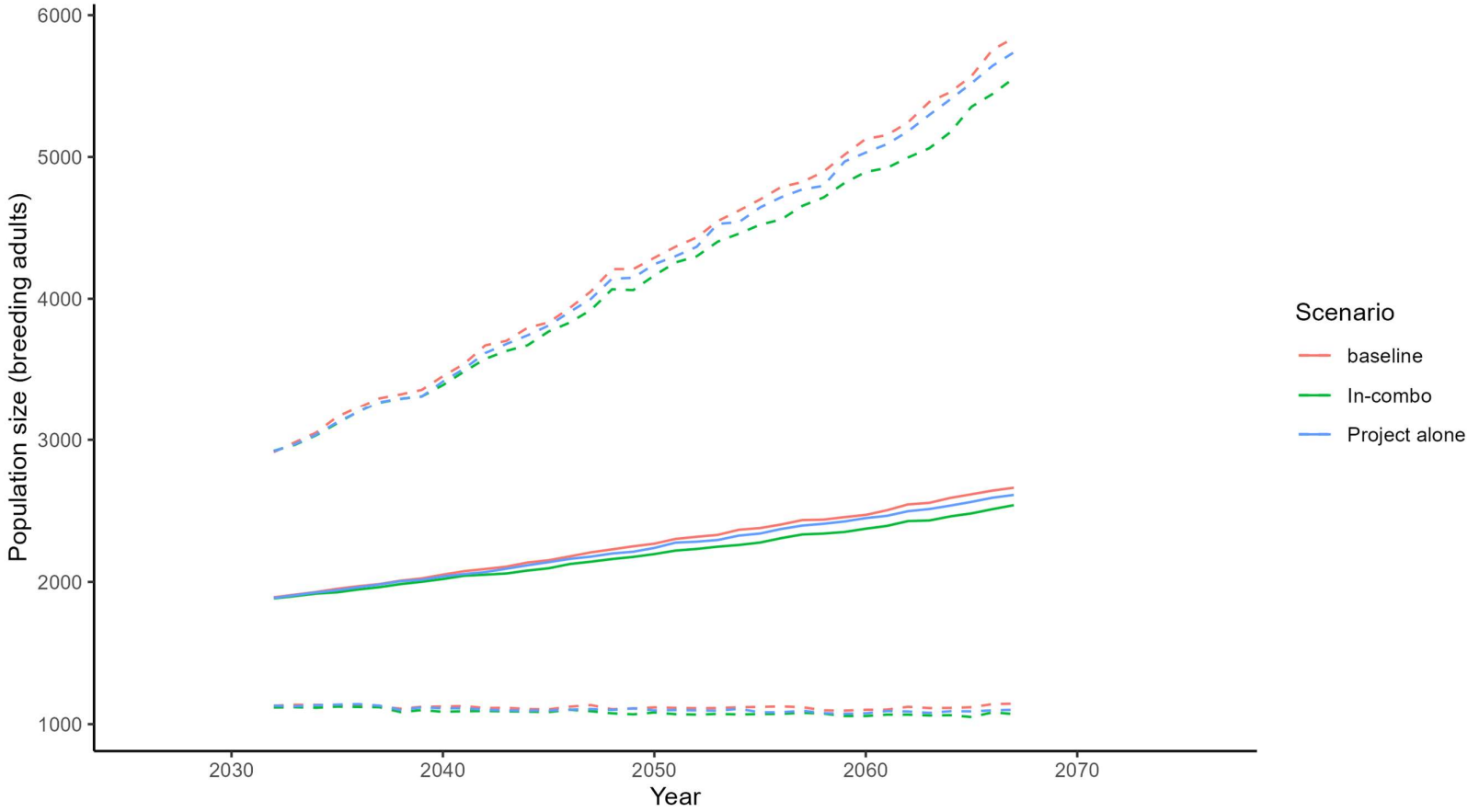

Figure 25. Razorbill Ireland's Eye SPA 50%, 1%

Table 54. Inputs: Razorbill Ireland's Eye SPA 70%, 2%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ra Ireland's Eye	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	2030
Random seed	26	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Razorbill	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.00128125
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.00178125
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	1600		
Year	2015		
Productivity rate per pair mean	0.5378833		
Productivity rate per pair standard deviation	0.2026453		
Adult survival rate Mean	0.895		
Adult survival rate standard deviation	0.067		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.067		
Immatures survival rates 1 to 2 mean	0.794		
Immatures survival rates 1 to 2 standard deviation	0.067		
Immatures survival rates 2 to 3 mean	0.895		
Immatures survival rates 2 to 3 standard deviation	0.067		
Immatures survival rates 3 to 4 mean	0.895000000000		
Immatures survival rates 3 to 4 standard deviation	6.700000000000		
Immatures survival rates 4 to 5 mean	0.895000000000		
Units for output	breeding.adults		

Table 55. Outputs: Razorbill Ireland's Eye SPA 70%, 2%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	2.0	0.00128125	25	0.9986	0.9986	0.0019	0.9947	1.0024	0.9624	0.9649	0.0589	0.8529	1.0854	46.20	53.96
In-combo	2.9	0.00178125	25	0.9980	0.9980	0.0019	0.9942	1.0017	0.9496	0.9503	0.0581	0.8400	1.0648	44.38	56.22
Project alone	2.0	0.00128125	35	0.9986	0.9986	0.0016	0.9955	1.0017	0.9500	0.9516	0.0635	0.8286	1.0850	44.72	55.28
In-combo	2.9	0.00178125	35	0.9979	0.9980	0.0016	0.9949	1.0011	0.9306	0.9318	0.0627	0.8137	1.0596	42.78	57.16

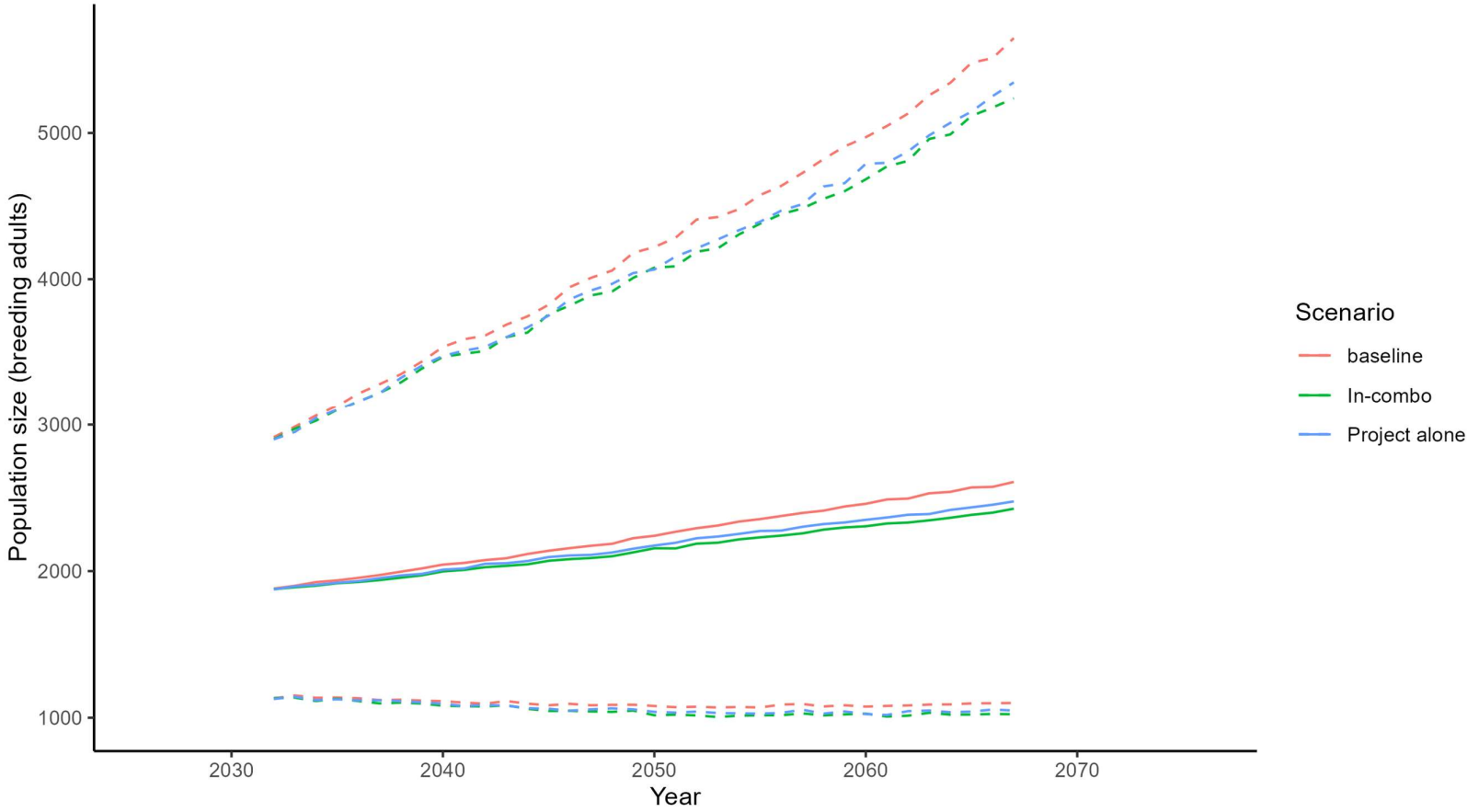

Figure 26. Razorbill Ireland's Eye SPA 70%, 2%

Table 56. Inputs: Razorbill Ireland's Eye SPA 60%, 1 and 3%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ra Ireland's Eye	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	2030
Random seed	27	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Razorbill	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0015875
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.002375
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	1600		
Year	2015		
Productivity rate per pair mean	0.5378833		
Productivity rate per pair standard deviation	0.2026453		
Adult survival rate Mean	0.895		
Adult survival rate standard deviation	0.067		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.067		
Immatures survival rates 1 to 2 mean	0.794		
Immatures survival rates 1 to 2 standard deviation	0.067		
Immatures survival rates 2 to 3 mean	0.895		
Immatures survival rates 2 to 3 standard deviation	0.067		
Immatures survival rates 3 to 4 mean	0.895000000000		
Immatures survival rates 3 to 4 standard deviation	6.700000000000		
Immatures survival rates 4 to 5 mean	0.895000000000		
Units for output	breeding.adults		

Table 57. Outputs: Razorbill Ireland's Eye SPA 60%, 1 and 3%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	2.5	0.0015875	25	0.9982	0.9982	0.0018	0.9946	1.0019	0.9553	0.9572	0.0573	0.8480	1.0751	45.80	54.44
In-combo	3.8	0.0023750	25	0.9973	0.9973	0.0018	0.9937	1.0010	0.9320	0.9340	0.0554	0.8281	1.0465	43.30	57.52
Project alone	2.5	0.0015875	35	0.9982	0.9982	0.0016	0.9952	1.0014	0.9393	0.9409	0.0630	0.8246	1.0704	44.02	56.12
In-combo	3.8	0.0023750	35	0.9973	0.9973	0.0016	0.9942	1.0004	0.9081	0.9102	0.0605	0.7940	1.0357	40.86	59.40

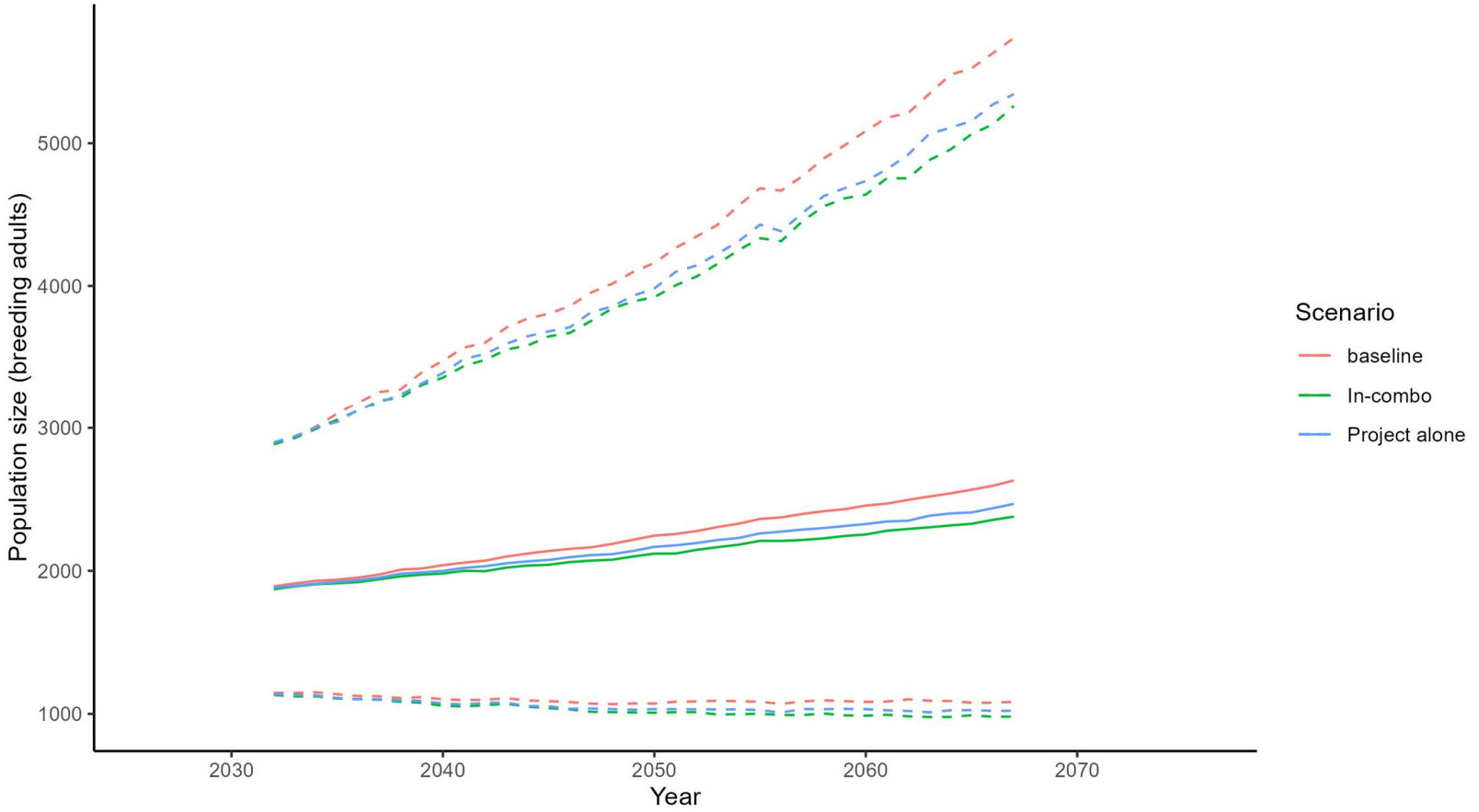

Figure 27. Razorbill Ireland's Eye SPA 60%, 1 and 3%

Table 58. Inputs: Razorbill Ireland's Eye SPA 60%, 3 and 5%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ra Ireland's Eye	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	2030
Random seed	28	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Razorbill	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0026875
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.00413125
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	1600		
Year	2015		
Productivity rate per pair mean	0.5378833		
Productivity rate per pair standard deviation	0.2026453		
Adult survival rate Mean	0.895		
Adult survival rate standard deviation	0.067		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.067		
Immatures survival rates 1 to 2 mean	0.794		
Immatures survival rates 1 to 2 standard deviation	0.067		
Immatures survival rates 2 to 3 mean	0.895		
Immatures survival rates 2 to 3 standard deviation	0.067		
Immatures survival rates 3 to 4 mean	0.895000000000		
Immatures survival rates 3 to 4 standard deviation	6.700000000000		
Immatures survival rates 4 to 5 mean	0.895000000000		
Units for output	breeding.adults		

Table 59. Outputs: Razorbill Ireland's Eye SPA 60%, 3 and 5%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	4.3	0.00268750	25	0.9970	0.9970	0.0020	0.9931	1.0008	0.9238	0.9258	0.0564	0.8200	1.0412	41.68	58.08
In-combo	6.6	0.00413125	25	0.9953	0.9953	0.0020	0.9914	0.9993	0.8849	0.8863	0.0550	0.7819	0.9995	37.24	63.02
Project alone	4.3	0.00268750	35	0.9970	0.9970	0.0016	0.9938	1.0001	0.8969	0.8980	0.0600	0.7856	1.0235	39.32	60.86
In-combo	6.6	0.00413125	35	0.9953	0.9953	0.0016	0.9921	0.9985	0.8439	0.8454	0.0577	0.7356	0.9681	34.14	66.62

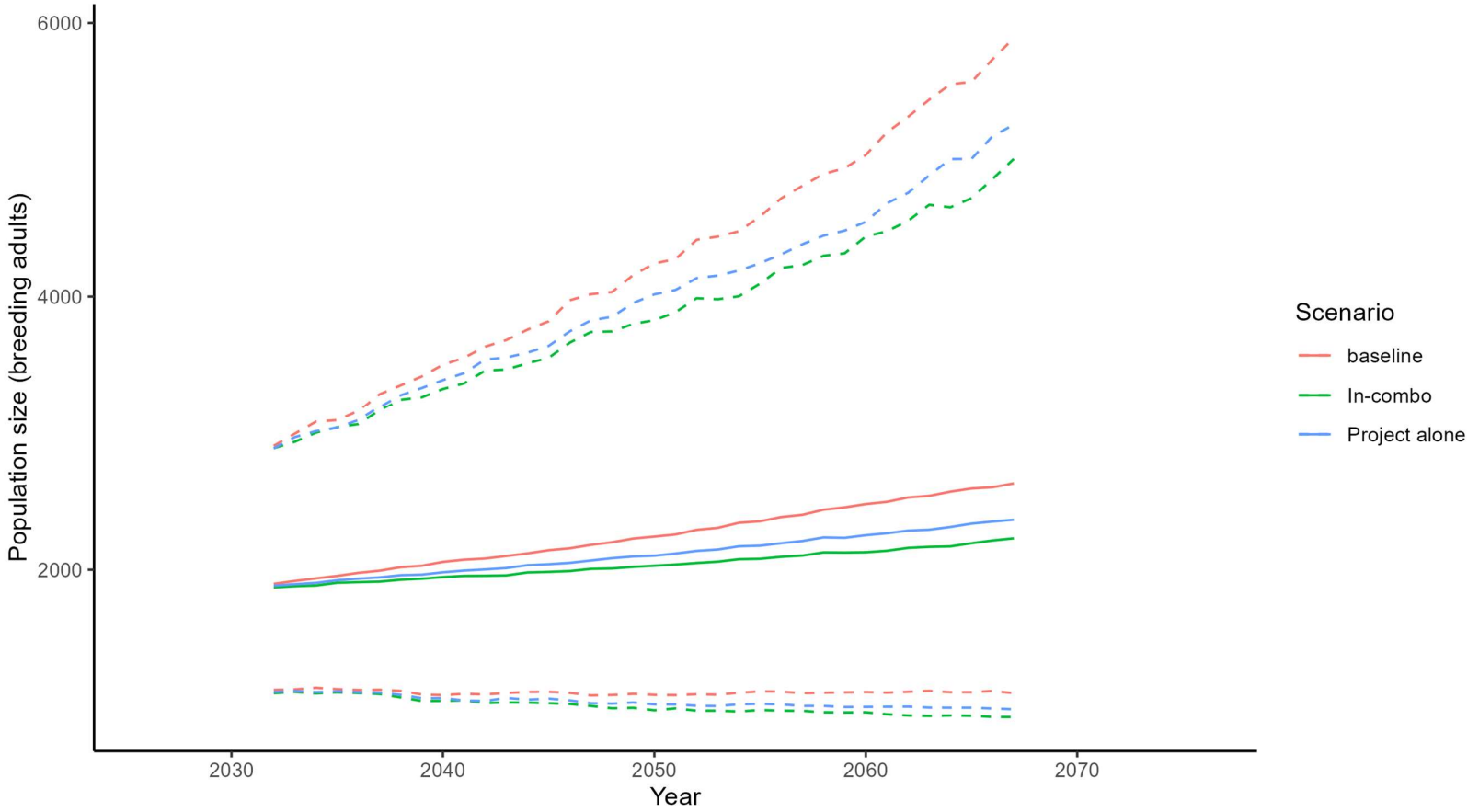

Figure 28. Razorbill Ireland's Eye SPA 60%, 3 and 5%

Table 60. Inputs: Razorbill Lambay Island SPA 50%, 1%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ra Lambay SPA	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	2030
Random seed	29	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Razorbill	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0002434381
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.001145111
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	7353		
Year	2015		
Productivity rate per pair mean	0.5378833		
Productivity rate per pair standard deviation	0.2026453		
Adult survival rate Mean	0.895		
Adult survival rate standard deviation	0.067		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.067		
Immatures survival rates 1 to 2 mean	0.794		
Immatures survival rates 1 to 2 standard deviation	0.067		
Immatures survival rates 2 to 3 mean	0.895		
Immatures survival rates 2 to 3 standard deviation	0.067		
Immatures survival rates 3 to 4 mean	0.895000000000		
Immatures survival rates 3 to 4 standard deviation	6.700000000000		
Immatures survival rates 4 to 5 mean	0.895000000000		
Units for output	breeding.adults		

Table 61. Outputs: Razorbill Lambay Island SPA 50%, 1%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	1.8	0.0002434381	25	0.9997	0.9997	0.0009	0.9980	1.0015	0.9930	0.9934	0.0281	0.9386	1.0498	49.52	50.68
In-combo	8.4	0.0011451108	25	0.9987	0.9987	0.0009	0.9969	1.0004	0.9670	0.9672	0.0268	0.9143	1.0205	46.58	53.10
Project alone	1.8	0.0002434381	35	0.9997	0.9997	0.0007	0.9983	1.0012	0.9902	0.9907	0.0306	0.9318	1.0511	49.16	50.94
In-combo	8.4	0.0011451108	35	0.9987	0.9987	0.0007	0.9973	1.0001	0.9545	0.9546	0.0290	0.8971	1.0135	45.42	53.80

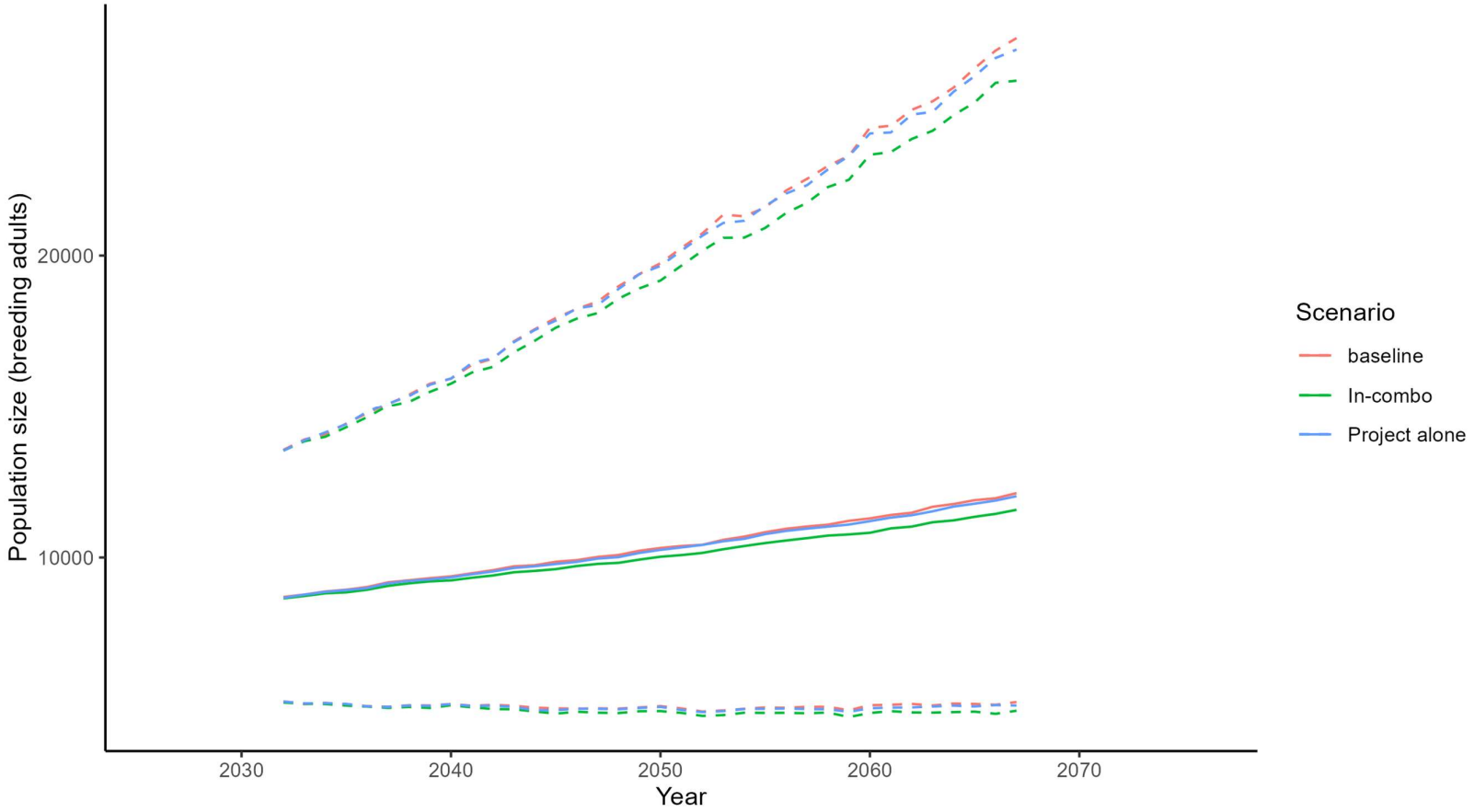

Figure 29. Razorbill Lambay Island SPA 50%, 1%

Table 62. Inputs: Razorbill Lambay Island SPA 70%, 2%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ra Lambay SPA	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	2030
Random seed	30	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Razorbill	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0006799946
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.003205494
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	7353		
Year	2015		
Productivity rate per pair mean	0.5378833		
Productivity rate per pair standard deviation	0.2026453		
Adult survival rate Mean	0.895		
Adult survival rate standard deviation	0.067		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.067		
Immatures survival rates 1 to 2 mean	0.794		
Immatures survival rates 1 to 2 standard deviation	0.067		
Immatures survival rates 2 to 3 mean	0.895		
Immatures survival rates 2 to 3 standard deviation	0.067		
Immatures survival rates 3 to 4 mean	0.895000000000		
Immatures survival rates 3 to 4 standard deviation	6.700000000000		
Immatures survival rates 4 to 5 mean	0.895000000000		
Units for output	breeding.adults		

Table 63. Outputs: Razorbill Lambay Island SPA 70%, 2%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	5.0	0.0006799946	25	0.9992	0.9992	0.0009	0.9975	1.0009	0.9796	0.9801	0.0276	0.9267	1.0357	47.80	52.04
In-combo	23.6	0.0032054944	25	0.9963	0.9963	0.0009	0.9945	0.9981	0.9092	0.9092	0.0258	0.8586	0.9590	40.14	60.38
Project alone	5.0	0.0006799946	35	0.9992	0.9992	0.0007	0.9978	1.0007	0.9722	0.9727	0.0300	0.9151	1.0327	46.90	52.92
In-combo	23.6	0.0032054944	35	0.9963	0.9963	0.0007	0.9949	0.9977	0.8760	0.8764	0.0276	0.8234	0.9311	37.20	61.98

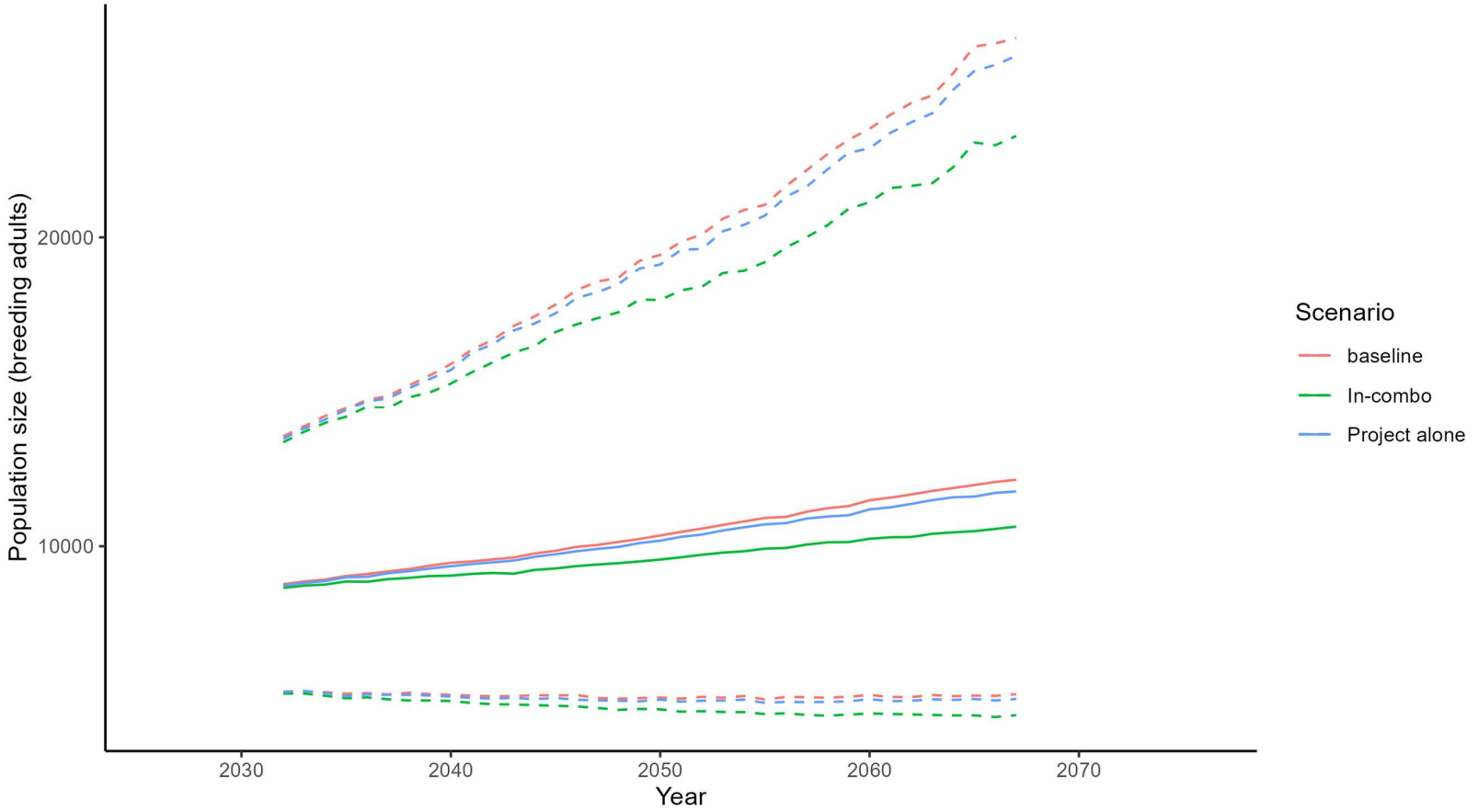

Figure 30. Razorbill Lambay Island SPA 70%, 2%

Table 64. Inputs: Razorbill Lambay Island SPA 60%, 1 and 3%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ra Lambay SPA	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	2030
Random seed	31	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Razorbill	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.0008173535
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.002717258
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	7353		
Year	2015		
Productivity rate per pair mean	0.5378833		
Productivity rate per pair standard deviation	0.2026453		
Adult survival rate Mean	0.895		
Adult survival rate standard deviation	0.067		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.067		
Immatures survival rates 1 to 2 mean	0.794		
Immatures survival rates 1 to 2 standard deviation	0.067		
Immatures survival rates 2 to 3 mean	0.895		
Immatures survival rates 2 to 3 standard deviation	0.067		
Immatures survival rates 3 to 4 mean	0.895000000000		
Immatures survival rates 3 to 4 standard deviation	6.700000000000		
Immatures survival rates 4 to 5 mean	0.895000000000		
Units for output	breeding.adults		

Table 65. Outputs: Razorbill Lambay Island SPA 60%, 1 and 3%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	6	0.0008173535	25	0.9991	0.9991	0.0009	0.9973	1.0008	0.9764	0.9764	0.0276	0.9235	1.0313	47.10	52.60
In-combo	20	0.0027172583	25	0.9969	0.9969	0.0009	0.9950	0.9986	0.9226	0.9229	0.0261	0.8712	0.9741	41.72	59.04
Project alone	6	0.0008173535	35	0.9991	0.9991	0.0007	0.9976	1.0005	0.9671	0.9676	0.0301	0.9099	1.0289	47.10	53.74
In-combo	20	0.0027172583	35	0.9969	0.9969	0.0007	0.9954	0.9983	0.8946	0.8947	0.0279	0.8392	0.9498	38.74	61.76

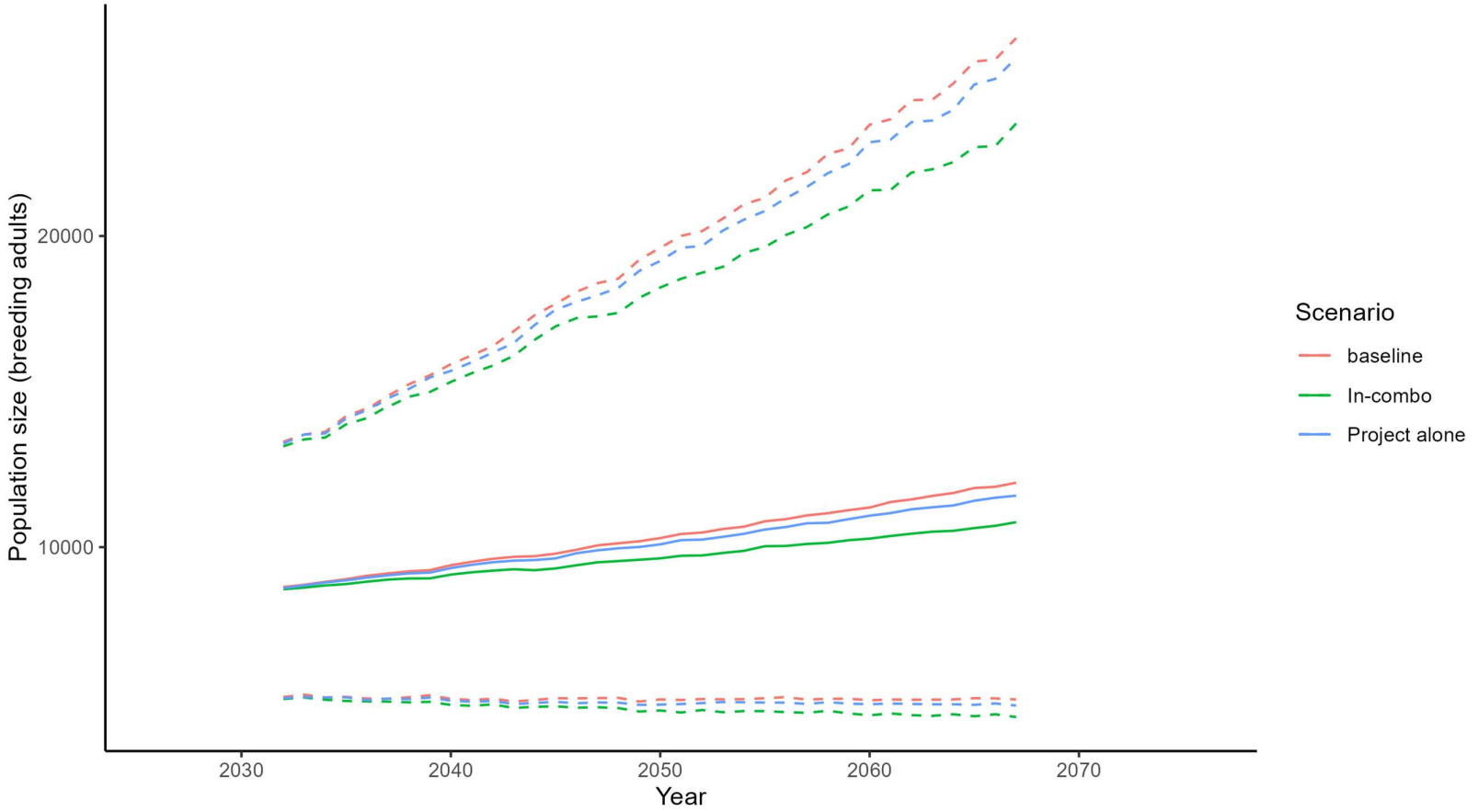

Figure 31. Razorbill Lambay Island SPA 60%, 1 and 3%

Table 66. Inputs: Razorbill Lambay Island SPA 60%, 3 and 5%

Baseline parameters	Settings	Impact parameters	Values
Reference name	Ra Lambay SPA	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	2030
Random seed	32	Years in which impacts are assumed to end	2065
Years for burn in	5	Scenario A name	Project alone
Species	Razorbill	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.001400789
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.005465796
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	7353		
Year	2015		
Productivity rate per pair mean	0.5378833		
Productivity rate per pair standard deviation	0.2026453		
Adult survival rate Mean	0.895		
Adult survival rate standard deviation	0.067		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.067		
Immatures survival rates 1 to 2 mean	0.794		
Immatures survival rates 1 to 2 standard deviation	0.067		
Immatures survival rates 2 to 3 mean	0.895		
Immatures survival rates 2 to 3 standard deviation	0.067		
Immatures survival rates 3 to 4 mean	0.895000000000		
Immatures survival rates 3 to 4 standard deviation	6.700000000000		
Immatures survival rates 4 to 5 mean	0.895000000000		
Units for output	breeding.adults		

Table 67. Outputs: Razorbill Lambay Island SPA 60%, 3 and 5%

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	10.3	0.001400789	25	0.9984	0.9984	0.0009	0.9966	1.0001	0.9592	0.9592	0.0267	0.9070	1.0144	45.62	54.50
In-combo	40.2	0.005465796	25	0.9938	0.9938	0.0009	0.9919	0.9955	0.8503	0.8499	0.0244	0.8015	0.8980	32.58	66.52
Project alone	10.3	0.001400789	35	0.9984	0.9984	0.0007	0.9970	0.9998	0.9435	0.9440	0.0290	0.8875	1.0020	44.40	55.86
In-combo	40.2	0.005465796	35	0.9938	0.9937	0.0007	0.9923	0.9952	0.7979	0.7981	0.0250	0.7485	0.8477	28.42	71.36

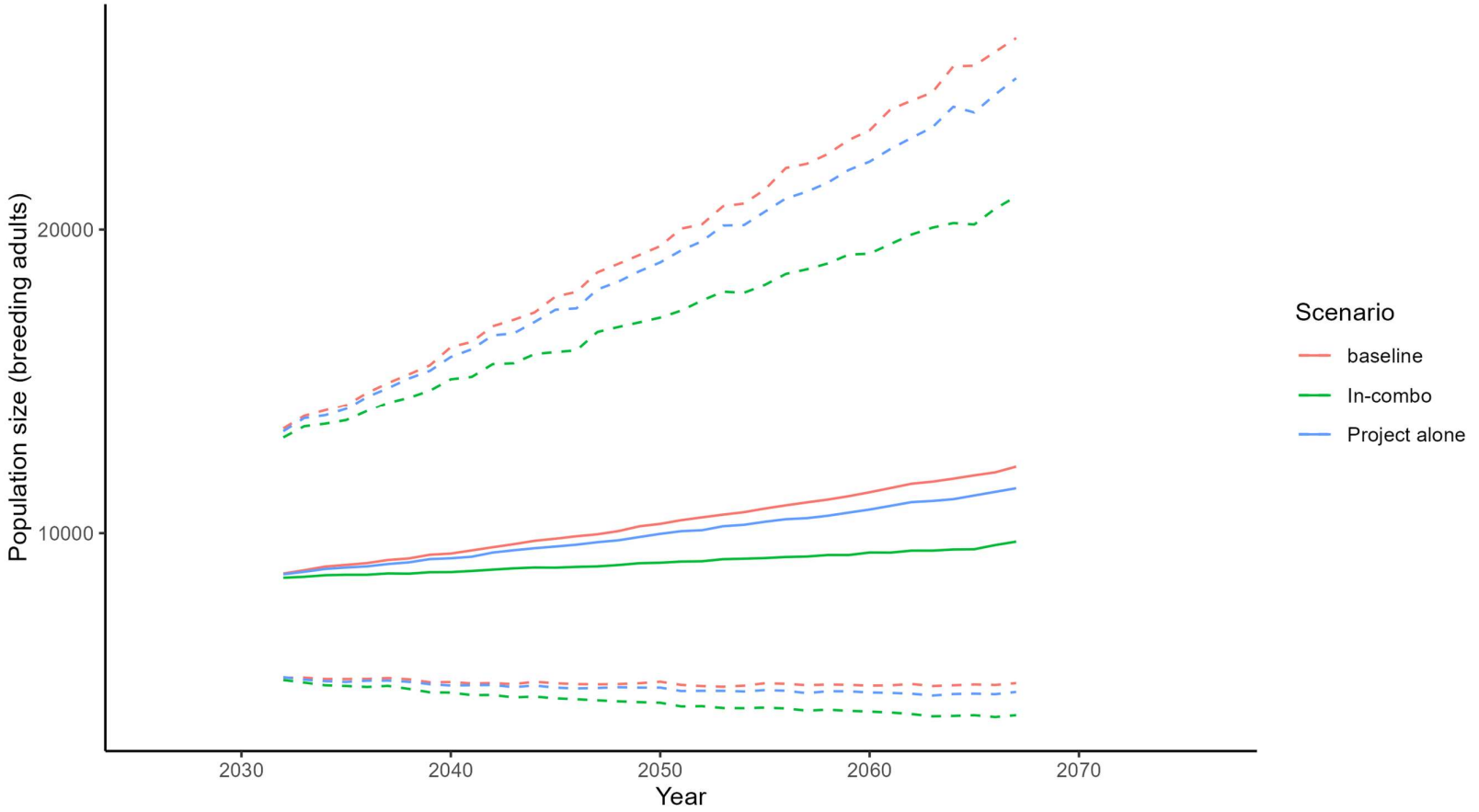

Figure 32. Razorbill Lambay Island SPA 60%, 3 and 5%

Table 68. Inputs: Herring Gull Ireland's Eye SPA

Baseline parameters	Settings	Impact parameters	Values
Reference name	HG Ireland's Eye	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	2030
Random seed	33	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Herring gull	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.001306533
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.003479899
Maximum brood size per pair chicks will be constrained to be no greater than	3	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	796		
Year	2016		
Productivity rate per pair mean	0.6375871		
Productivity rate per pair standard deviation	0.3789584		
Adult survival rate Mean	0.834		
Adult survival rate standard deviation	0.079		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.079		
Immatures survival rates 1 to 2 mean	0.834		
Immatures survival rates 1 to 2 standard deviation	0.079		
Immatures survival rates 2 to 3 mean	0.834		
Immatures survival rates 2 to 3 standard deviation	0.079		
Immatures survival rates 3 to 4 mean	0.833999999999		
Immatures survival rates 3 to 4 standard deviation	7.900000000000		
Immatures survival rates 4 to 5 mean	0.833999999999		
Units for output	breeding.adults		

Table 69. Outputs: Herring Gull Ireland's Eye SPA

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	1.0	0.001306533	25	0.9984	0.9983	0.0057	0.9871	1.0098	0.9580	0.9699	0.1580	0.6997	1.3218	47.22	53.56
In-combo	2.8	0.003479899	25	0.9957	0.9957	0.0058	0.9839	1.0072	0.8909	0.9045	0.1490	0.6411	1.2294	41.04	58.80
Project alone	1.0	0.001306533	35	0.9983	0.9984	0.0054	0.9878	1.0094	0.9433	0.9626	0.2001	0.6328	1.4113	46.22	54.62
In-combo	2.8	0.003479899	35	0.9957	0.9957	0.0055	0.9846	1.0072	0.8560	0.8745	0.1852	0.5663	1.2931	39.10	61.52

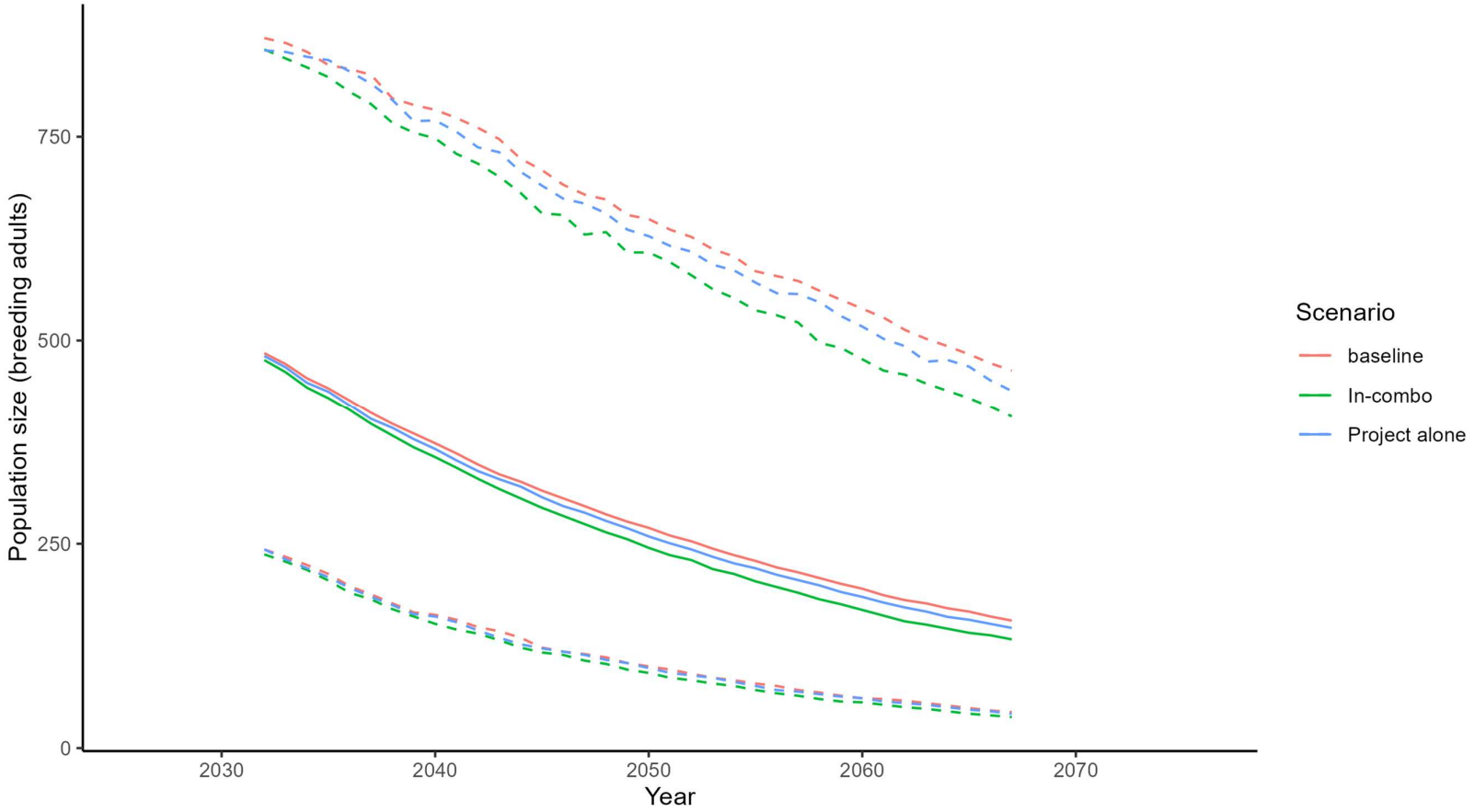

Figure 33. Herring Gull Ireland's Eye SPA

Table 70. Inputs: Herring Gull Lambay Island SPA

Baseline parameters	Settings	Impact parameters	Values
Reference name	HG Lambay	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	2030
Random seed	34	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Herring gull	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.000700883
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.003863135
Maximum brood size per pair chicks will be constrained to be no greater than	3	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	1812		
Year	2015		
Productivity rate per pair mean	0.6375871		
Productivity rate per pair standard deviation	0.3789584		
Adult survival rate Mean	0.834		
Adult survival rate standard deviation	0.079		
Immatures survival rates 0 to 1 mean	0.794		
Immatures survival rates 0 to 1 standard deviation	0.079		
Immatures survival rates 1 to 2 mean	0.834		
Immatures survival rates 1 to 2 standard deviation	0.079		
Immatures survival rates 2 to 3 mean	0.834		
Immatures survival rates 2 to 3 standard deviation	0.079		
Immatures survival rates 3 to 4 mean	0.833999999999		
Immatures survival rates 3 to 4 standard deviation	7.900000000000		
Immatures survival rates 4 to 5 mean	0.833999999999		
Units for output	breeding.adults		

Table 71. Outputs: Herring Gull Lambay Island SPA

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	1.3	0.000700883	25	0.9992	0.9992	0.0040	0.9914	1.0073	0.9795	0.9864	0.1105	0.7862	1.2266	48.54	51.50
In-combo	7.0	0.003863135	25	0.9953	0.9954	0.0040	0.9876	1.0031	0.8869	0.8924	0.1010	0.7079	1.1021	40.98	59.64
Project alone	1.3	0.000700883	35	0.9992	0.9991	0.0037	0.9918	1.0065	0.9679	0.9786	0.1378	0.7388	1.2816	48.18	52.40
In-combo	7.0	0.003863135	35	0.9952	0.9953	0.0037	0.9879	1.0025	0.8423	0.8508	0.1217	0.6409	1.1127	38.56	61.90

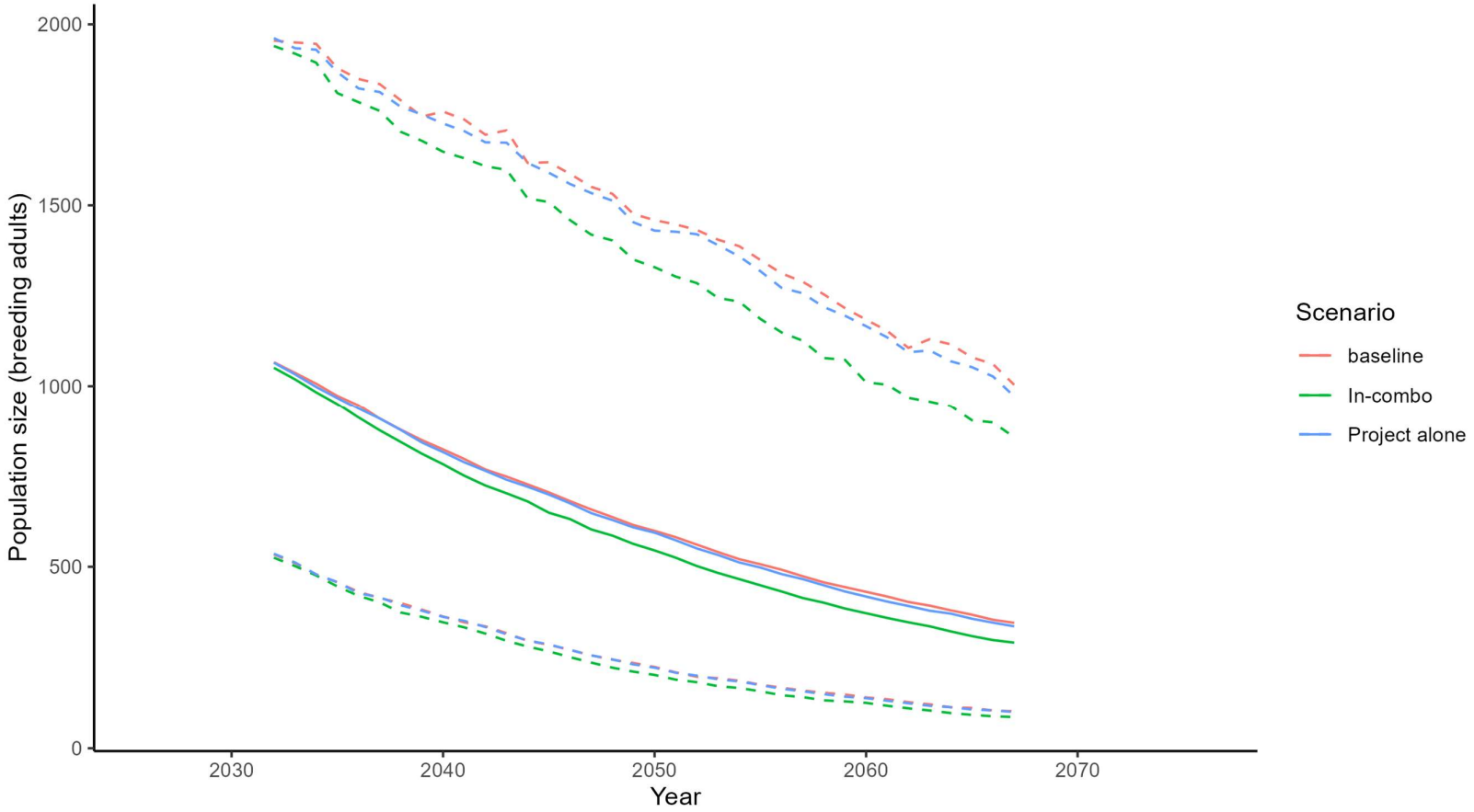

Figure 34. Herring Gull Lambay Island SPA

Table 72. Inputs: Lesser Black-backed Gull Lambay Island SPA

Baseline parameters	Settings	Impact parameters	Values
Reference name	LB Lambay	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	2030
Random seed	36	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Lesser black-	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.001028986
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	5	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.001391304
Maximum brood size per pair chicks will be constrained to be no greater than	3	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	690		
Year	2018		
Productivity rate per pair mean	0.438		
Productivity rate per pair standard deviation	0.356		
Adult survival rate Mean	0.885		
Adult survival rate standard deviation	0.056		
Immatures survival rates 0 to 1 mean	0.82		
Immatures survival rates 0 to 1 standard deviation	0.056		
Immatures survival rates 1 to 2 mean	0.885		
Immatures survival rates 1 to 2 standard deviation	0.056		
Immatures survival rates 2 to 3 mean	0.885		
Immatures survival rates 2 to 3 standard deviation	0.056		
Immatures survival rates 3 to 4 mean	0.885000000000		
Immatures survival rates 3 to 4 standard deviation	5.600000000000		
Immatures survival rates 4 to 5 mean	0.885000000000		
Units for output	breeding.adults		

Table 73. Outputs: Lesser Black-backed Gull Lambay Island SPA

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	0.7	0.001028986	25	0.9988	0.9987	0.0039	0.9910	1.0064	0.9660	0.9727	0.1107	0.7696	1.2115	47.38	53.32
In-combo	1.0	0.001391304	25	0.9984	0.9984	0.0039	0.9907	1.0064	0.9590	0.9653	0.1096	0.7700	1.2042	46.66	53.40
Project alone	0.7	0.001028986	35	0.9989	0.9988	0.0033	0.9921	1.0055	0.9573	0.9646	0.1263	0.7395	1.2348	46.88	52.96
In-combo	1.0	0.001391304	35	0.9984	0.9984	0.0034	0.9916	1.0052	0.9433	0.9523	0.1254	0.7311	1.2308	46.16	54.00

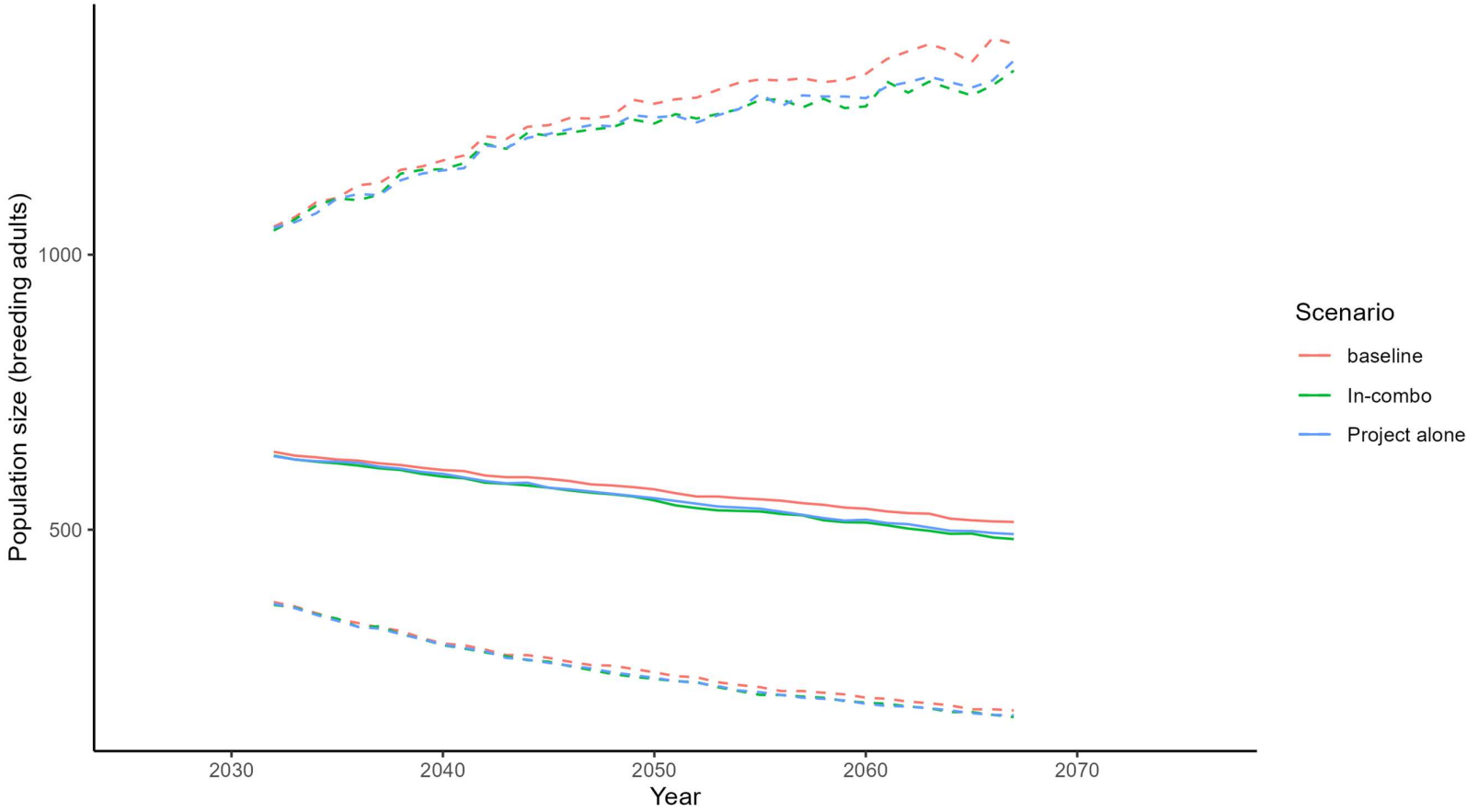

Figure 35. Lesser Black-backed Gull Lambay Island SPA

Table 74. Inputs: Common Tern South Dublin Bay and River Tolka Estuary SPA

Baseline parameters	Settings	Impact parameters	Values
Reference name	CT South Dublin	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	2030
Random seed	37	Years in which impacts are assumed to end	2065
Years for burn in	0	Scenario A name	Project alone
Species	Common tern	Scenario A Impact on productivity	0
Region type to use for breeding success data	Reg.Seas	Scenario A Impact on adult survival rate	0.001295547
Sector to use within breeding success region	Irish Sea	Scenario A Impact on immature survival rate mean	-
Available colony specific survival rate	National	Scenario B name	In-combo
Age at first breeding	3	Scenario B Impact on productivity	0
Is there an upper constraint on productivity in the model	TRUE	Scenario B Impact on adult survival rate	0.003593117
Maximum brood size per pair chicks will be constrained to be no greater than	4	Scenario B Impact on immature survival rate mean	-
Number of subpopulations	1		
Units for initial population size	breeding.adults		
Are baseline demographic rates specified separately for immatures	TRUE		
Initial population size	988		
Year	2016		
Productivity rate per pair mean	0.764		
Productivity rate per pair standard deviation	0.47		
Adult survival rate Mean	0.883		
Adult survival rate standard deviation	0.014		
Immatures survival rates 0 to 1 mean	0.761		
Immatures survival rates 0 to 1 standard deviation	1e-05		
Immatures survival rates 1 to 2 mean	0.761		
Immatures survival rates 1 to 2 standard deviation	1e-05		
Immatures survival rates 2 to 3 mean	0.761		
Immatures survival rates 2 to 3 standard deviation	1e-05		
Immatures survival rates 3 to 4 mean	-		
Immatures survival rates 3 to 4 standard deviation	-		
Immatures survival rates 4 to 5 mean	-		
Units for output	breeding.adults		

Table 75. Outputs: Common Tern South Dublin Bay and River Tolka Estuary SPA

Scenario	Mortality	Increase in mortality rate	Year	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Project alone	1.3	0.001295547	25	0.9984	0.9985	0.0021	0.9942	1.0027	0.9620	0.9632	0.0717	0.8258	1.1075	46.58	53.46
In-combo	3.5	0.003593117	25	0.9957	0.9957	0.0022	0.9913	0.9999	0.8935	0.8960	0.0683	0.7700	1.0378	40.04	60.26
Project alone	1.3	0.001295547	35	0.9985	0.9985	0.0017	0.9950	1.0019	0.9472	0.9487	0.0748	0.8089	1.0999	45.72	54.42
In-combo	3.5	0.003593117	35	0.9957	0.9957	0.0017	0.9922	0.9991	0.8558	0.8588	0.0696	0.7314	1.0050	37.36	62.48

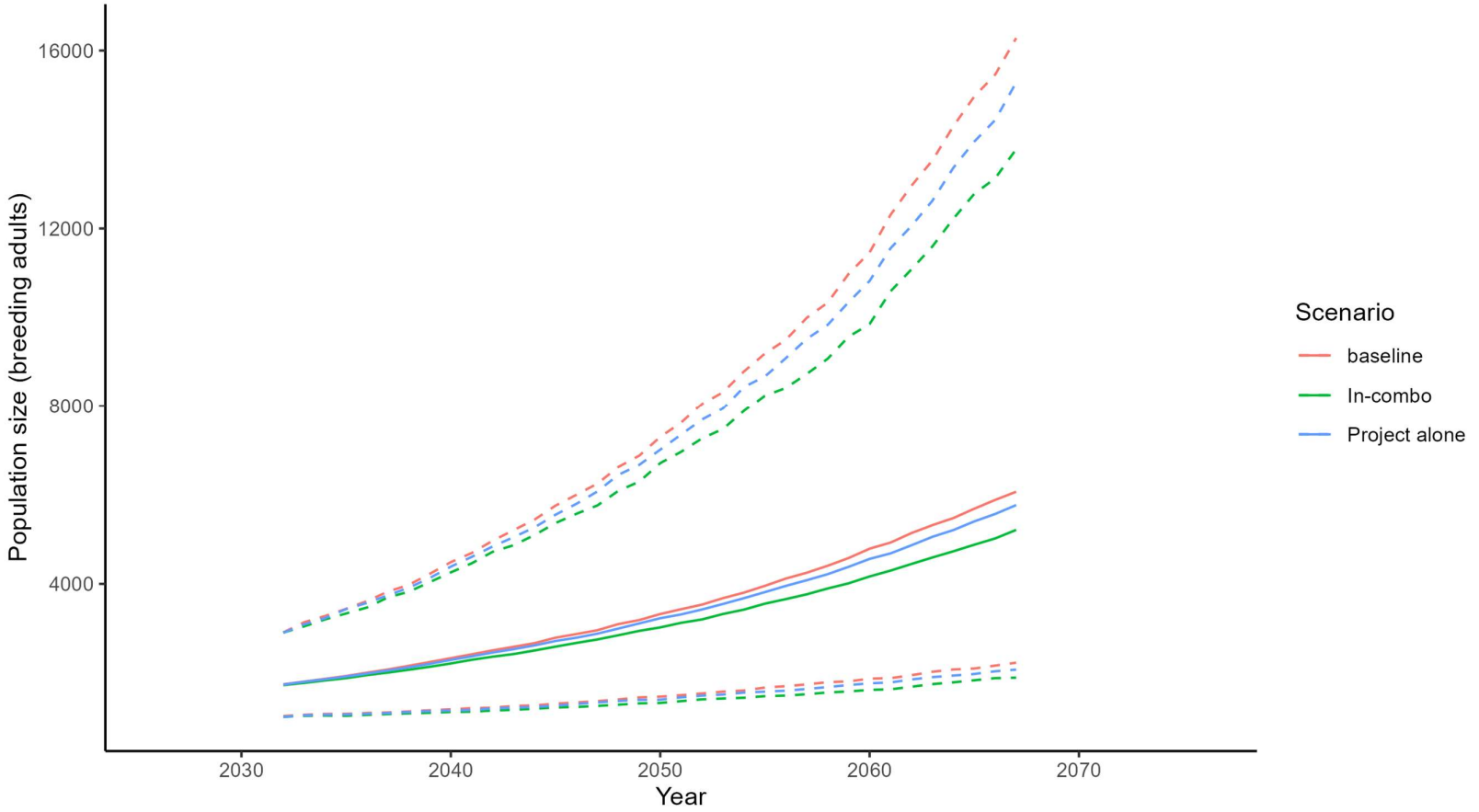

Figure 36. Common Tern South Dublin Bay and River Tolka Estuary SPA

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