



Spiorad na Mara Offshore Wind Farm

Offshore Project

Report to Inform Appropriate Assessment

Appendix E: HRA Population Viability Analysis Report

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1 INTRODUCTION

1.1 OVERVIEW

1.1.1.1 This appendix of the **Offshore Report to Inform Appropriate Assessment (RIAA)** presents the Population Viability Analysis (PVA) modelling undertaken for the proposed Spiorad na Mara Offshore Wind Farm, with respect to Marine and Nearshore Ornithology.

1.1.1.2 This appendix should be read in conjunction with the **Offshore RIAA** and its associated Appendices:

- **Offshore RIAA Appendix A: Confirmed Screening Conclusions;**
- **Offshore RIAA Appendix B: Information on Designated Sites;**
- **Offshore RIAA Appendix C: Consultation;**
- **Offshore RIAA Appendix D: Offshore Ornithology Apportioning;**
- **Offshore RIAA Annex D.1: Individual Colony Apportionment (Breeding Season).**

1.1.1.3 This appendix should also be read in conjunction with the following chapters and appendices within the **Offshore Environmental Impact Assessment Report (EIAR)**:

- **Offshore EIAR Chapter 3: Project Description, Volume 1a;**
- **Offshore EIAR Chapter 14: Marine and Nearshore Ornithology, Volume 2a;**
- **Offshore EIAR Appendix 14.2: Displacement Report, Volume 2c; and**
- **Offshore EIAR Appendix 14.3: Collision Risk Modelling Report, Volume 2c.**

1.1.1.4 The results of the PVAs are presented and assessed within Section 8 and Section 13 of the **Offshore RIAA**, and provide context as to how the impacted populations are predicted to grow under the potential impact scenarios.

1.1.2 PROJECT BACKGROUND

1.1.2.1 Spiorad na Mara Limited (hereafter referred to as 'the Applicant') is proposing to develop the Project. The Project is an offshore wind farm (OWF) and associated onshore infrastructure that will consist of up to 60 fixed-bottom wind turbine generators (WTGs).

1.1.2.2 The Project will include both offshore and onshore infrastructure. The Offshore EIAR and Offshore RIAA supports the application for the offshore components of the Project as outlined in **Offshore EIAR Chapter 1: Introduction, Volume 1a**. The offshore components of the Project (hereafter referred to as the 'Offshore Project') include all infrastructure and activities located seaward of Mean High Water Springs (MHWS) within the Array Area and Offshore Cable Area of Search (OCAS) (see **Offshore EIAR Figure 1.2: Offshore Project Location, Volume 1b**). Further detailed information is provided in **Offshore EIAR Chapter 3, Volume 1a**.

1.1.2.3 The Offshore Project is situated off the northwest coast of Isle of Lewis/*Eilean Leòdhais* and the Array Area is located approximately 5-13 km offshore and is approximately 161 km² in size. It will comprise WTGs, foundations, Offshore Cables, Offshore Substation Platform (OSP) (if required), and Landfall. The Array Area combined with the OCAS is defined as the Offshore Project Boundary. The water depths across the Array Area range from 37 m-67 m with the southwest corner of the Array Area reaching 72 m. The proposed WTGs and fixed foundations will be located within a Turbine Area of approximately 140 km², within the Array Area.

1.2 PURPOSE OF THIS APPENDIX

1.2.1.1 This appendix describes the following:

- Section 1 Introduction: sets out the potential for offshore wind farms to impact seabirds, and the utility of PVA in understanding how those impacts may affect populations over time;
- Section 2 Methodology: sets out the methodology used for the PVA modelling carried out, including generic input parameters such as species demographic rates;
- Section 3 Input Parameters: sets out the specific input parameters related to the impacts of the Offshore Project; i.e. the number of mortalities expected and the assessment scenarios leading to them;
- Section 4 Offshore Project Alone Assessment Outputs: sets out the results of PVA modelling for impacts from the Offshore Project alone;
- Section 5 Offshore Project In-Combination Assessment Outputs: sets out the results of PVA modelling for impacts from the Offshore Project in-combination with other plans and project.

1.2.2 IMPACT BACKGROUND

1.2.2.1 Seabirds can be impacted by offshore wind developments in a number of ways, including collision with wind turbine blades resulting in mortality, and displacement from an area due to the presence of wind turbines. These processes affect individuals, but also have the potential to affect the productivity or elevate the baseline mortality of a population. This can be particularly apparent when considering in-combination effects (i.e. when the project alone effects are considered alongside any effects from other projects on the same receptor). The Habitats Regulations Appraisal (HRA) process allows for evaluating the potential impacts of offshore wind farms on different population scales on protected features of the UK National Site Network and European Sites.

1.2.2.2 One method to estimate the potential impact that offshore wind projects alone or in-combination may have on a population is through PVA. PVA provides a robust framework using demographic parameters to predict changes in the population, using statistical population models to forecast future changes over a set period. Comparisons are made between 'baseline' conditions whereby conditions remain unimpacted and under 'impact scenario' conditions where an impact is applied

to a population by the alteration of demographic parameters. Population metrics that are derived from comparisons of 'baseline' and 'impacted scenarios' predictions generated by PVAs can then be used to assess the significance of the anticipated additional mortality associated with planned developments. Assessing the acceptability of the impact involves evaluating biological responses alongside statutory, policy, and other relevant considerations. There is no universally defined threshold for what constitutes an 'acceptable' level of impact; rather, determinations will be population-specific and guided by a comprehensive analysis of these factors.

1.2.2.3 PVA was carried out for the predicted offshore ornithology impacts of the Offshore Project, both alone and in-combination with other plans and projects. This was undertaken because the predicted impacts of Section 8 (Offshore Project alone assessment) and Section 13 (in-combination assessment) of the **Offshore RIAA** indicated that impact during the operation and maintenance phase (alone and in-combination) would exceed a 0.02 percentage point decrease in annual adult survival rate for several seabird populations. A 0.02 percentage point decrease in annual adult survival rate is the threshold level at which further assessments, such as PVA, are considered necessary for the relevant regional populations (NatureScot, 2023b).

1.2.2.4 As part of the Offshore Project Marine and Nearshore Ornithology alone (Section 8) and in-combination (Section 13) assessments within the **Offshore RIAA**, the species¹ and associated populations selected for further assessment were:

- Black-legged kittiwake *Rissa tridactyla* (hereafter referred to as "kittiwake") at:
 - Cape Wrath Special Protection Area (SPA) (in-combination);
 - East Caithness Cliffs SPA (in-combination);
 - North Caithness Cliffs SPA (in-combination);
 - North Colonsay and Western Cliffs SPA (in-combination);
 - Rathlin Island SPA (in-combination);
 - West Westray SPA (in-combination).
- Common guillemot *Uria aalge* (hereafter referred to as "guillemot") at:
 - Cape Wrath SPA (alone and in-combination);
 - Flannan Isles SPA (alone and in-combination);
 - Handa SPA (alone and in-combination);
 - North Rona and Sula Sgeir SPA (alone and in-combination);

¹ The order of species within this Appendix follows the British List managed by the British Ornithologists' Union (BOU) (BOU, 2022)

- Sule Skerry and Sule Stack SPA (in-combination).
- Razorbill *Alca torda* at:
 - Cape Wrath SPA (in-combination);
 - Flannan Isles SPA (alone and in-combination);
 - Handa SPA (alone and in-combination);
 - Mingulay and Berneray SPA (in-combination);
 - North Rona and Sula Sgeir SPA (alone and in-combination);
 - Rathlin Island SPA (in-combination);
 - Shiant Isles SPA (alone and in-combination);
 - Skomer, Skokholm and the Seas off Pembrokeshire SPA (in-combination);
 - St Kilda SPA (in-combination).
- Atlantic puffin *Fratercula arctica* (hereafter referred to as "puffin") at:
 - Cape Wrath SPA (in-combination);
 - Flannan Isles SPA (alone and in-combination);
 - Shiant Isles SPA (in-combination);
 - Sule Skerry and Sule Stack SPA (in-combination);
 - St Kilda SPA (in-combination).
- Red-throated diver *Gavia stellata* at:
 - Lewis Peatlands SPA (alone and in-combination).
- Northern gannet *Morus bassanus* (hereafter referred to as "gannet") at:
 - Ailsa Craig SPA (in-combination);
 - Forth Islands SPA (in-combination);
 - Grassholm SPA (in-combination);
 - Hermaness, Saxa Vord and Valla Field SPA (in-combination);
 - North Rona and Sula Sgeir SPA (in-combination);
 - Noss SPA (in-combination);
 - St Kilda SPA (in-combination);

- Sule Skerry and Sule Stack SPA (in-combination).

2 METHODOLOGY

2.1 PVA OVERVIEW

- 2.1.1.1 The PVAs were undertaken using the Seabird PVA Tool developed by Natural England (Searle *et al.*, 2019). This tool provides a user-friendly interface for conducting PVA for seabird species, particularly in the context of assessing potential impacts from offshore wind developments. The PVAs were run using NatureScot's recommended approach (NatureScot, 2023c), which includes using Natural England's PVA Tool.
- 2.1.1.2 The PVA tool was implemented in the R statistical environment, and its functionality is underpinned by the nepva R package, which provides a suite of functions for running stochastic PVA simulations. While the graphical interface is suitable for general use, this assessment utilised the underlying R code directly, allowing for greater flexibility and transparency in model configuration and output handling.
- 2.1.1.3 Specifically, the analysis was based on version 4.18 of the nepva R package, as maintained in the official Natural England GitHub repository (Natural England, 2020). All modelling was conducted using R version 4.5.0 for Windows (R Core Team, 2025).
- 2.1.1.4 The PVAs implemented in this assessment is based on a stochastic Leslie Matrix model, a widely used demographic modelling framework for age-structured populations. The Leslie Matrix projects population dynamics over time by applying age-specific survival and fecundity rates to a population vector, allowing for the estimation of future population size and structure under different scenarios.
- 2.1.1.5 In this case, the model was configured to simulate stochastic variation in demographic parameters, reflecting natural variability in survival and reproduction. The code allows for the assessment of a wide range of potential impacts, including changes to demographic rates (e.g. reduced survival or productivity), fixed annual removals (e.g. culling), or combinations of both. This flexibility enables the model to simulate realistic population responses to pressures such as those associated with offshore wind farm developments.
- 2.1.1.6 PVAs were run for a 50 year timespan from the first full year of predicted impact from the Offshore Project (2034). It's anticipated that the construction phase will finish in 2033 (**Offshore EIAR Chapter 3, Volume 1a**), therefore the PVAs were set to run from 2034. Results were extracted after 35 and 50 years of impacts, with 35 years being the proposed operational lifespan of the Offshore Project. Following engagement with NatureScot (09 June 2025), it was confirmed that a 25-year modelling period was not required and is therefore not presented in this Appendix (see **Offshore RIAA Appendix C**).
- 2.1.1.7 The following sections provided specific information, which is included within the PVAs. Section 2.2 (Modelling Approach) covers how the model was run and what outputs are considering the most

important in interpreting the results. Within Section 2.3 (Simulation Parameters) presents how many simulations were run within each PVA, and finally within Section 2.4 (Model Parameterisation) the specific input parameters used within the Offshore Project alone and cumulative PVAs for the species and scenarios considered.

2.2 MODELLING APPROACH

- 2.2.1.1 All PVA models were undertaken using the 'nepva.fullrun' function within the nepva R package, which is used to simulate population trajectories based on the specified demographic parameters, initial population sizes and impact scenarios that the user inputs into the model.
- 2.2.1.2 The tool includes an option to run the model as either density independent, or density dependent. Density dependence is self-evident in the natural environment, as without density dependence, populations would grow or decline exponentially. For seabird populations, the mechanisms by which this operates are largely uncertain, and individual populations may show negative, positive or no density dependence (e.g. Merrall *et al.*, 2024; Horswill *et al.*, 2017). If density dependence is mis-specified in an assessment, the modelled predictions may be unreliable. Therefore, unless density dependence is known for the modelled population, then it is more typical to use density independent models for seabird assessments, accepting that if compensatory density dependence is occurring then this approach may underestimate impacts, but that if compensatory population growth is occurring then this approach may be considered precautionary. For the PVA runs undertaken within this Appendix all models were therefore run using density independence due to a lack of available evidence as to the density dependence of the modelled populations. Presenting density independent PVA outputs is in line with NatureScot guidance (NatureScot, 2023b). It should be noted that many natural processes which occur within a population e.g. immigration and emigration are therefore not captured within these PVAs by running them density independently.
- 2.2.1.3 Environmental stochasticity, which accounts for the variation arising from environmental changes affecting individuals in the same group (e.g. between-year differences in weather conditions), was incorporated in the models at the level of productivity and survival rates. For each simulated year, a value for each demographic rate was randomly generated from a probability distribution defined by the mean and standard deviation (SD) estimates of that rate for the population under consideration.
- 2.2.1.4 Demographic stochasticity, which accounts for individual-level variation affecting transition probabilities between age-classes, was included in the models. For large populations, like most of the ones considered in this analysis, the effects of environmental stochasticity are deemed more important than those associated with demographic stochasticity (Morris and Doak, 2002). However, including demographic stochasticity will not cause any issues when simulating larger populations (Wildfowl and Wetlands Trust (WWT) Consulting, 2012) and hence has been included. It should be noted that the red-throated diver population modelled is not especially large, (80 pairs), and

therefore the results should be treated with some caution as any change which occurs to a small population is likely to have a disproportionate effect on the predicted population. Larger populations can fluctuate to a greater extent and recover when compared to smaller populations.

- 2.2.1.5 The PVA outputs are as expressed as the Counterfactual of Population Size (CPS) or the Counterfactual of Growth Rate (CGR). These are the ratio of the impacted to unimpacted population size and growth rate after the modelled time period, respectively. For example if the impacted population after 35 years is 9,000 birds whilst the unimpacted population is 10,000 birds, the CPS would be $9,000/10,000 = 0.9$. This can be equally expressed as a 10% lower population size at the end of the 35 year period, and this formulation has also been provided in the results to aid intuitive understanding of the results.
- 2.2.1.6 In this assessment, the models have been run under density-independent assumptions, which means that population growth is not limited by factors such as resource availability or carrying capacity. Under these conditions, the CGR is generally considered the more robust and informative metric, as it reflects the proportional change in the long-term growth rate of the population due to the impact being assessed (NatureScot, 2023c).
- 2.2.1.7 While both CPS and CGR outputs are presented in line with NatureScot's (NatureScot, 2023c) guidance, the interpretation of results in **Offshore RIAA, Volume 2a** focuses on CGR, as it provides a clearer indication of potential long-term population-level effects in the absence of density regulation. This is in line with ecological modelling principles described by White (2016), where it is noted that the interpretation of the CGR is better suited to density-independent models, as it shows how a population responds to external pressures without the added complexity of feedback effects. In contrast, CPS is more appropriate metric when density dependence is explicitly included in the model, as it reflects how population size changes over time in response to natural constraints such as resource limitation and carrying capacity.
- 2.2.1.8 Additionally, the quantile from the unimpacted population that matched the 50% quantile for the impacted population (Unimpacted=50% of Impacted ($U=50\%I$)) and the quantile from the impacted population that matched the 50% quantile for the unimpacted population (Impacted =50% of Unimpacted ($I=50\%U$)) have been presented. These quantiles provide metrics indicative of the range of plausible outcomes (resulting from demographic and environmental stochasticity modelled within the PVA) and the likelihood of outcomes occurring under both impacted and unimpacted scenarios, aiding in assessing the magnitude of impact and potential consequences.
- 2.2.1.9 For example, if $U=50\%I$ is 42, this means that in 42% of model runs of the unimpacted scenario, the population was smaller than the median (50th percentile) population size of the impacted scenario. A corresponding $I=50\%U$ value may be 55, which would indicate that median (50th percentile) unimpacted population size was equal to the 55th percentile population size of the impacted model runs (i.e. 45% of impacted model runs led to a population size that was larger than the median unimpacted population size). Such a result would indicate the impact is relatively small and unlikely

to be detectable in the real world, as there is significant overlap in the range of outcomes across impacted and unimpacted scenarios. It should be noted that NatureScot (2023c) are clear that there is no precise point at which an impact is or is not acceptable, and the outputs of the PVA model are just 1 piece of the information considered when assessing an impact.

2.3 SIMULATION PARAMETERS

- 2.3.1.1 All PVA modelling in this appendix was undertaken with environmental and demographic stochasticity. To ensure robust results, all simulations were set to run 5,000 times (5,000 runs is regarded as the standard approach and has been utilised in several offshore wind applications such as Hornsea Four Offshore Wind Farm, Awel Y Mor Offshore Wind Farm, Mona and Morgan Offshore Wind Farms, Berwick Bank Offshore Wind Farm and Green Volt Offshore Wind Farm). All models were run over a 50-year period to cover the lifetime of the Offshore Project and beyond. Results are presented for both a 35-year period (reflecting the predicted lifetime of the Offshore Project) and a 50-year period, as agreed with NatureScot (09 July, 2025).
- 2.3.1.2 In most cases, modelling has been undertaken including a 5 year 'burn in' period within the model. Applying a 'burn in' period allows for a stable age structure to form when starting to run the model. Within the model, impacts were set to commence from the year after the Project is anticipated to become fully operational. It's anticipated that the construction phase will finish in 2033 (**Offshore EIAR Chapter 3, Volume 1a**), therefore the PVAs were set to run from 2034 and run for 50 years. For some runs, the burn in led to error messages and so the burn in was turned off in those cases. The PVA models often cannot accommodate the 5 year burn in period when the starting populations are small, therefore if a population is <2,000 individuals then the burn in period was set to zero years. Only 4 populations are less than 2,000 birds (these are razorbill from Flannan Isles SPA, North Rona and Sula Sgier SPA and St Kilda SPA and red-throated diver from Lewis Peatlands SPA as shown in **Table 2-2**), and these had a burn in period of zero years. Results after 35 and 50 years of impact were extracted from the annual model outputs. Whilst having a burn in period can reduce model biases, over a relatively long time period (i.e. the 35-year operational period), the impact of not including a burn in is expected to be negligible.
- 2.3.1.3 Impacted vs unimpacted comparisons were based on a matched runs approach, whereby stochasticity is applied to the population before impacts are applied (i.e. survival and productivity rates simulated at each time step are the same for the unimpacted and impacted populations before additional impact mortalities are deducted from simulated survivals for the impacted populations). This approach has been used, as analyses from previous studies have demonstrated that stochastic models using a matched runs approach were likely to be the most precautionary (Cook and Robinson, 2017). Productivity rates used within the analysis were therefore unaffected by the predicted impacts from the Offshore Project alone and in-combination on offshore ornithology receptors.

2.4 MODEL PARAMETERISATION

2.4.1 DEMOGRAPHIC RATES

- 2.4.1.1 The species listed in **Table 2-1** are those that following assessment in Section 8 (the Offshore Project alone assessment) and Section 13 (the in-combination assessment) of the **Offshore RIAA** resulted in an increase of more than 0.02 percentage points in the baseline mortality rate.. As such, demographic rates were required for these species to enable further assessment in case predicted impacts exceeded the 0.02 percentage point survival threshold and a PVA was subsequently required.
- 2.4.1.2 Age-specific survival rates for each species from Horswill and Robinson (2015) were entered into a matrix population model. Updated productivity values were provided from the Seabird Monitoring Programme by Joint Nature Conservation Committee (JNCC)/British Trust for Ornithology (BTO) (JNCC *et al.*, 2024), with the UK average over the course of 2010 to 2019 calculated and used. Not all species and colonies had updated counts after 2014, and so the national average from Horswill and Robinson (2015) was used if no updated rates from JNCC/BTO were made available. The mortality rate can be subsequently calculated by subtracting the survival rate from 1. The demographic rates, age class proportions and mortality rates calculated are presented in **Table 2-1**.
- 2.4.1.3 For red-throated diver, when running the model with the juvenile survival rates presented in Horswill and Robinson (2015), the model population quickly declines to zero. This is therefore both uninformative (i.e. there is no difference between the unimpacted and impacted populations, as both are zero), and contrary to the observed population trend of increasing numbers (Dillon *et al.*, 2009). Horswill and Robinson (2015) noted methodological concerns about the studies from which the red-throated diver juvenile survival rates were obtained, and recommend using the rates for great northern diver instead. Therefore, the juvenile survival rates used for PVA for red-throated diver (as presented in **Table 2-1**) are the great northern diver juvenile survival rates from Horswill and Robinson (2015). Whilst the PVA model still produces a declining population trend using these rates, the population does not decline to zero within the modelled period and therefore the results can be used.

Table 2-1 Demographic Rates from JNCC/BTO (JNCC *et al.*, 2024) and Horswill and Robinson (2015)

| Species | Age at First Breeding | Maximum Eggs per Pair | Survival by Age Class (mean \pm sd) | | | | | | | Productivity (Chicks per Pair) |
|--------------------|-----------------------|-----------------------|---------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------------------|
| | | | 0 to 1 | 1 to 2 | 2 to 3 | 3 to 4 | 4 to 5 | 5 to 6 | Adult | |
| Kittiwake | 4 | 2 | 0.790 \pm 0.077 | 0.854 \pm 0.077 | 0.854 \pm 0.077 | 0.854 \pm 0.077 | N/A | N/A | 0.854 \pm 0.077 | 0.619 \pm 0.127 |
| Guillemot | 6 | 1 | 0.560 \pm 0.058 | 0.792 \pm 0.152 | 0.917 \pm 0.098 | 0.938 \pm 0.107 | 0.940 \pm 0.025 | 0.940 \pm 0.025 | 0.940 \pm 0.025 | 0.583 \pm 0.079 |
| Razorbill | 5 | 1 | 0.630 \pm 0.067 | 0.630 \pm 0.067 | 0.895 \pm 0.067 | 0.895 \pm 0.067 | 0.895 \pm 0.067 | N/A | 0.895 \pm 0.067 | 0.532 \pm 0.089 |
| Puffin | 5 | 1 | 0.709 \pm 0.108 | 0.709 \pm 0.108 | 0.709 \pm 0.108 | 0.760 \pm 0.093 | 0.805 \pm 0.083 | N/A | 0.907 \pm 0.083 | 0.557 \pm 0.115 |
| Red-throated diver | 3 | 3 | 0.770 \pm 0.141 | 0.770 \pm 0.141 | 0.770 \pm 0.141 | N/A | N/A | N/A | 0.840 \pm 0.074 | 0.571 \pm 0.222 |
| Gannet | 5 | 1 | 0.424 \pm 0.045 | 0.829 \pm 0.026 | 0.891 \pm 0.019 | 0.895 \pm 0.019 | 0.919 \pm 0.042 | N/A | 0.919 \pm 0.042 | 0.766 \pm 0.054 |



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2.4.2 POPULATIONS

2.4.2.1 For kittiwake, guillemot, razorbill, puffin and gannet, the initial population size inputted into all PVAs used the most recent complete SPA population census values from the Seabird Count surveys undertaken between 2014 and 2021 (Burnell *et al.*, 2023). These census values were then converted into estimates of breeding adults (as described in Mitchell *et al.* (2004)), as presented in **Table 2-2**. For kittiwake, puffin, red-throated diver and gannet, the latest census data are doubled to present the number of breeding adults as when undertaking the census counts the nesting features are counted e.g. the number of occupied burrows. For guillemot and razorbill, the latest census data are multiple by 1.34 as recommended in Mitchell *et al.*, (2004), due to not all birds being present on the nesting ledges when the counts were undertaken and the birds counted as individuals.

2.4.2.2 For red-throated diver, the initial population was set at the citation level (JNCC, 2018) as there is no more recent population estimate that the Applicant is aware of (with the latest UK census being undertaken in 2006 and reported in Dillion *et al.*, 2009).

Table 2-2 Populations used as initial population within PVA

| Feature | SPA | Year(s) of Count | Population (Breeding Adults) Number of Birds | Calculation from Census Data to Breeding Adults |
|-----------|---------------------------------------|------------------|--|---|
| Kittiwake | Cape Wrath SPA | 2017 | 7,244 | Apparently Occupied Nests (AON) x2 |
| | East Caithness Cliffs SPA | 2015 | 48,958 | AON x2 |
| | North Caithness Cliffs SPA | 2016 | 26,200 | AON x2 |
| | North Colonsay and Western Cliffs SPA | 2016/ and 2018 | 6,694 | AON x2 |
| | Rathlin Island SPA | 2021 | 27,412 | AON x2 |
| | West Westray SPA | 2017 | 5,510 | AON x2 |
| Guillemot | Cape Wrath SPA | 2017 | 51,066 | Individuals counted at the colony (IND) x1.34 |
| | Flannan Isles SPA | 2021 | 7,547 | IND x1.34 |
| | Handa SPA | 2016 | 73,250 | IND x1.34 |
| | North Rona and Sula Sgeir SPA | 2021 | 10,354 | IND x1.34 |
| | Sule Skerry and Sule Stack SPA | 2015 | 12,060 | IND x1.34 |
| Razorbill | Cape Wrath SPA | 2017 | 4,350 | IND x1.34 |
| | Flannan Isles SPA | 2021 | 1,532 | IND x1.34 |
| | Handa SPA | 2019 | 10,997 | IND x1.34 |
| | Mingulay and Berneray SPA | 2017 and 2021 | 26,787 | IND x1.34 |
| | North Rona and Sula Sgeir SPA | 2021 | 531 | IND x1.34 |
| | Rathlin Island SPA | 2021 | 30,044 | IND x1.34 |

| Feature | SPA | Year(s) of Count | Population (Breeding Adults) Number of Birds | Calculation from Census Data to Breeding Adults |
|--------------------|---|------------------|--|---|
| | Shiant Isles SPA | 2015 | 10,759 | IND x1.34 |
| | Skomer, Skokholm and the Seas off Pembrokeshire SPA | 2017 and 2021 | 15,975 | IND x1.34 |
| | St Kilda SPA | 2015 and 2016 | 1,099 | IND x1.34 |
| Puffin | Cape Wrath SPA | 2017 | 4,488 | Apparently Occupied Burrows (AOB) x2 |
| | Flannan Isles SPA | 2021 | 98,944 | AOB x2 |
| | Shiant Isles SPA | 2015 | 129,390 | AOB x2 |
| | Sule Skerry and Sule Stack SPA | 2018 | 95,484 | AOB x2 |
| | St Kilda SPA | 2018 and 2019 | 197,586 | AOB x2 |
| Red-throated diver | Lewis Peatlands SPA | 2006 | 160 | Breeding pairs x2 |
| Gannet | Ailsa Craig SPA | 2014 | 66,452 | AON or Apparently Occupied Sites (AOS) x 2 |
| | Forth Islands SPA | 2014 | 150,518 | AON/AOS x 2 |
| | Grassholm SPA | 2015 | 72,022 | AON/AOS x 2 |
| | Hermaness, Saxa Vord and Valla Field SPA | 2021 | 59,124 | AON/AOS x 2 |
| | North Rona and Sula Sgeir SPA | 2017 | 24,542 | AON/AOS x 2 |
| | Noss SPA | 2019 | 27,530 | AON/AOS x 2 |
| | St Kilda SPA | 2013 | 120,580 | AON/AOS x 2 |
| | Sule Skerry and Sule Stack SPA | 2013 and 2018 | 18,130 | AON/AOS x 2 |

2.4.3 IMPACT SCENARIOS

2.4.3.1 The first step in the PVA process was to determine whether any predicted impacts, either from the Offshore Project alone or in-combination with other plans and projects, exceeded the 0.02 percentage point change in baseline survival/mortality threshold. As explained in Section 1.2.2, this threshold acts as a screening tool to identify impacts that could meaningfully influence population dynamics and therefore require further assessment through PVA. Full calculations are presented in Section 8 (Offshore Project alone) and Section 13 (Offshore Project in-combination) of the **Offshore RIAA**. For any scenarios where the impact did not exceed the 0.02 percentage point threshold, a PVA was not considered necessary, as such impacts would be indistinguishable from

natural population fluctuations and unlikely to cause any detectable population-level effects. These scenarios are therefore not presented within this appendix.

2.4.3.2 Only impacts which have a quantifiable effect are included within this appendix, namely collision, displacement and combined collision and displacement.

2.4.3.3 For both collision risk and displacement, model-based estimates were used wherever available, in line with NatureScot advice that these should take precedence over design-based estimates (NatureScot, 2023a). Where model-based estimates could not be derived because Marine Renewables Strategic Environmental Assessment (MRSea) modelling was not possible (e.g. due to low levels of recorded observations), design-based estimates were used instead (see Section 14.9.2 of **EIAR Chapter 14, Volume 2a** and **EIAR Appendix 14.2, Volume 2c** for additional information).

2.4.3.4 Within both the Offshore Project alone and in-combination PVAs a range of displacement rates are used; those recommended by NatureScot (2023c) which are presented as the 'Upper' and 'Lower' scenarios, and also, where relevant, the Applicant's approach (**Table 2-3**).

Table 2-3 Displacement scenarios considered within PVA

| Feature | Scenario Name | Impact Rates |
|-----------|--|--|
| Kittiwake | Displacement NatureScot Lower and Applicant (30/1) | 30% displacement and 1% mortality (breeding and non-breeding seasons) |
| | Displacement NatureScot Upper (30/3) | 30% displacement and 3% mortality (breeding and non-breeding seasons) |
| Guillemot | Displacement NatureScot Lower (60/3/1) | 60% displacement and 3% mortality (breeding season) and 1% mortality (non-breeding season) |
| | Displacement NatureScot Upper (60/5/3) | 60% displacement and 5% mortality (breeding season) and 3% mortality (non-breeding season) |
| | Displacement Applicant (50/1/1) | 50% displacement and 1% mortality (breeding and non-breeding seasons) |
| Razorbill | Displacement NatureScot Lower (60/3/1) | 60% displacement and 3% mortality (breeding season) and 1% mortality (non-breeding season) |
| | Displacement NatureScot Upper (60/5/3) | 60% displacement and 5% mortality (breeding season) and 3% mortality (non-breeding season) |

| Feature | Scenario Name | Impact Rates |
|--------------------|--|--|
| | Displacement Applicant (50/1/1) | 50% displacement and 1% mortality (breeding and non-breeding seasons) |
| Puffin | Displacement NatureScot Lower (60/3/1) | 60% displacement and 3% mortality (breeding season) and 1% mortality (non-breeding season) |
| | Displacement NatureScot Upper (60/5/3) | 60% displacement and 5% mortality (breeding season) and 3% mortality (non-breeding season) |
| | Displacement Applicant (50/1/1) | 50% displacement and 1% mortality (breeding and non-breeding seasons) |
| Red-throated diver | Displacement NatureScot and Applicant (100/10) | 100% displacement and 10% mortality (breeding and non-breeding seasons) |
| Gannet | Displacement NatureScot Lower and Applicant (70/1) | 70% displacement and 1% mortality (breeding and non-breeding seasons) |
| | Displacement NatureScot Upper (70/3) | 70% displacement and 3% mortality (breeding and non-breeding seasons) |

2.4.3.5 For the assessment of collision risk for the Offshore Project and other developments considered in the in-combination assessment, impacts were first grouped by the appropriate seasons (e.g. pre-breeding, breeding, post-breeding, and non-breeding seasons, as applicable). Following NatureScot guidance (NatureScot, 2025a), where a month spanned 2 seasons (for example, April being part of both the pre-breeding and breeding seasons), collision estimates for that month were split evenly, with 50% assigned to each relevant season.

2.4.3.6 Collision risk estimates can be produced both stochastically or deterministically, which accounts for, or ignores, environmental variability. NatureScot (and the other Statutory Nature Conservation Bodies (SNCBs)) recommend different avoidance rates to be used within the stochastic and deterministic Collision Risk Modelling (CRM)s (Joint SNCBs, 2024). Within the in-combination assessment, the other developments' predicted collision estimates have been updated to the latest advised avoidance rate (Joint SNCBs, 2024). The avoidance rate used within the correction calculation depends on if the original CRM (from the other development) was run stochastically or deterministically. The Joint SNCBs guidance (Joint SNCBs, 2024) specifies both the stochastic

avoidance rate and the deterministic avoidance rate. For clarity the avoidance rates used are presented in **Table 2-4**.

Table 2-4: Avoidance rates used to correct predicted collisions considered within the in-combination PVAs

| Feature | Stochastic Avoidance Rate | Deterministic Avoidance Rate |
|-------------------------|---------------------------|------------------------------|
| Kittiwake | 0.9929 | 0.9923 |
| Great black-backed gull | 0.9940 | 0.9936 |
| Herring gull | 0.9940 | 0.9936 |
| Arctic tern | 0.9908 | 0.9902 |
| Gannet | 0.9929 | 0.9923 |

2.4.3.7 The combined impact of collision and displacement was also considered for kittiwake and gannet. The combined impact of collision and displacement was calculated by simply summing the displacement and collision mortality estimates. It should be noted that this simple summing approach has the potential to overestimate impacts due to double counting – birds that are displaced from a wind farm are not vulnerable to collision, whilst birds that suffer mortality due to collision are no longer liable to be displaced. Whilst a 70% macro avoidance is accounted for in collision estimates for gannet in the non-breeding season (in line with NatureScot advice, see **EIAR Appendix 14.6: EIA Ornithology Consultation, Volume 2c**), no macro avoidance is applied to kittiwake or to gannet in the breeding season.

2.4.3.8 As outlined in the **Offshore RIAA** and **Offshore RIAA Appendix C**, and in-line with Marine Directorate - Licensing Operations Team (MD-LOT) and NatureScot advice (MD-LOT, 2025 and NatureScot, 2025b), compensated birds from consented projects have been excluded from the in-combination PVAs. Consequently, impacts from Berwick Bank, Green Volt, Salamander, and West of Orkney have been adjusted accordingly. Full details of the approach and methodology for the in-combination assessment, including the treatment of compensated impacts, are provided in **Offshore RIAA**.

2.4.3.9 There was also an additional request from MD-LOT (see **Offshore RIAA Appendix C**) to present a 'with' and 'without Berwick Bank' impact scenario, albeit that consent was received in August 2025. There are no SPAs which have guillemot and/or red-throated diver as qualifying features which have connectivity with both Berwick Bank and the Offshore Project due to the species foraging range. Therefore, no 'with' and 'without Berwick Bank' scenarios are presented for either species.

3 INPUT PARAMETERS

- 3.1.1.1 For scenarios where a PVA was undertaken, the impact from the Offshore Project alone (Section 8 of the **Offshore RIAA** and presented in **Table 3-1**), as well as in-combination with other plans and projects (Section 13 of the **Offshore RIAA** and presented in **Table 3-2**), was parametrised as a relative harvest. This means the impact was modelled as an increase in the baseline mortality rate (or decrease in baseline survival rate as these numbers are the same) as a result of the predicted mortality. Specifying a relative harvest means that the absolute number of birds expected to suffer mortality is proportional to the population size, which aligns with the approach used for both collision risk and displacement analysis. The relative harvest used as the PVA input is equal to the percentage point decrease in adult survival, expressed as a decimal (e.g. a 0.02 percentage point decrease in adult survival would be input to the model as a relative harvest of 0.0002).
- 3.1.1.2 Each simulation run within the PVA model was paired with an impact scenario that included additional population-level mortality due to wind turbine collision and/or displacement impacts. This additional mortality was calculated as a proportion of the starting population and applied to the adult age class only. This way, the number of additional deaths scaled proportionately with changes to the simulated number of breeding adults in the population.

Table 3-1 Scenarios from the Offshore Project alone assessment that require PVA modelling

| Species | SPA | SPA Population (breeding adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage point decrease in adult survival |
|--------------------|-------------------------------|----------------------------------|--|---|---|
| Guillemot | Cape Wrath SPA | 51,066 | Displacement NatureScot Upper (60/5/3) | 10.80 | 0.0212 |
| | Flannan Isles SPA | 7,547 | Displacement NatureScot Upper (60/5/3) | 2.28 | 0.0302 |
| | Handa SPA | 73,250 | Displacement NatureScot Upper (60/5/3) | 17.00 | 0.0232 |
| | North Rona and Sula Sgeir SPA | 10,354 | Displacement NatureScot Upper (60/5/3) | 2.27 | 0.0219 |
| Razorbill | Flannan Isles SPA | 1,532 | Displacement NatureScot Upper (60/5/3) | 0.92 | 0.0598 |
| | | | Displacement NatureScot Lower (60/3/1) | 0.53 | 0.0347 |
| | Handa SPA | 10,997 | Displacement NatureScot Upper (60/5/3) | 2.94 | 0.0268 |
| | North Rona and Sula Sgeir SPA | 531 | Displacement NatureScot Upper (60/5/3) | 0.16 | 0.0304 |
| | Shiant Isles SPA | 10,759 | Displacement NatureScot Upper (60/5/3) | 2.35 | 0.0218 |
| Puffin | Flannan Isles SPA | 98,944 | Displacement NatureScot Upper (60/5/3) | 31.99 | 0.0323 |
| Red-throated diver | Lewis Peatlands SPA | 160 | Displacement NatureScot and Applicant (100/10) | 0.26 | 0.1611 |

Table 3-2 Scenarios from the Offshore Project in-combination assessment that require PVA modelling

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|-----------|----------------|----------------------------------|--|---|---|
| Kittiwake | Cape Wrath SPA | 7,244 | Collision only (with Berwick Bank) | 11.63 | 0.1605 |
| | | | Collision only (without Berwick Bank) | 11.55 | 0.1595 |
| | | | Displacement NatureScot Upper (30/3) (with Berwick Bank) | 5.01 | 0.0692 |
| | | | Displacement NatureScot Upper (30/3) (without Berwick Bank) | 4.95 | 0.0683 |
| | | | Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 1.67 | 0.0231 |
| | | | Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 1.65 | 0.0228 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 16.64 | 0.2297 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 16.50 | 0.2277 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 13.30 | 0.1836 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|---|----------------------------------|---|---|---|
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 13.20 | 0.1822 |
| | East Caithness Cliffs SPA As part of Berwick Bank's consent, the impact on kittiwake from East Caithness Cliffs SPA would be compensated, therefore the with or without Berwick Bank impact is the same. | 48,958 | Collision only | 205.75 | 0.4203 |
| | | | Displacement NatureScot Upper (30/3) | 139.27 | 0.2845 |
| | | | Displacement NatureScot Lower and Applicant (30/1) | 46.41 | 0.0948 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) | 345.01 | 0.7047 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) | 252.16 | 0.5151 |
| | Flamborough and Filey Coast SPA As part of Berwick Bank's consent, the impact on kittiwake from Flamborough and Filey Coast SPA would be compensated, therefore the with or without | 91,008 | Collision only | 435.64 | 0.4787 |
| | | | Displacement NatureScot Upper (30/3) | 285.95 | 0.3142 |
| | | | Displacement NatureScot Lower and Applicant (30/1) | 95.27 | 0.1047 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) | 721.59 | 0.7929 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) | 530.91 | 0.5834 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|---|----------------------------------|--|---|---|
| | Berwick Bank impact is the same. | | | | |
| | North Caithness Cliffs SPA As part of Berwick Bank's consent, the impact on kittiwake from North Caithness Cliffs SPA would be compensated, therefore the with or without Berwick Bank impact is the same. | 26,200 | Collision only | 39.00 | 0.1489 |
| | | | Displacement NatureScot Upper (30/3) | 28.69 | 0.1095 |
| | | | Displacement NatureScot Lower and Applicant (30/1) | 9.56 | 0.0365 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) | 67.69 | 0.2584 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) | 48.56 | 0.1854 |
| | North Colonsay and Western Cliffs SPA | 6,694 | Collision only (with Berwick Bank) | 5.97 | 0.0892 |
| | | | Collision only (without Berwick Bank) | 5.16 | 0.0771 |
| | | | Displacement NatureScot Upper (30/3) (with Berwick Bank) | 2.41 | 0.0360 |
| | | | Displacement NatureScot Upper (30/3) (without Berwick Bank) | 2.01 | 0.0300 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 8.38 | 0.1251 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|--------------------|----------------------------------|---|---|---|
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 7.17 | 0.1072 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 6.77 | 0.1012 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 5.83 | 0.0872 |
| | Rathlin Island SPA | 27,412 | Collision only (with Berwick Bank) | 8.86 | 0.0323 |
| | | | Collision only (without Berwick Bank) | 8.80 | 0.0321 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 12.40 | 0.0452 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 12.29 | 0.0448 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 10.04 | 0.0366 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 9.97 | 0.0364 |
| | West Westray SPA | 5,510 | Collision only (with Berwick Bank) | 42.69 | 0.7750 |
| | | | Collision only (without Berwick Bank) | 37.28 | 0.6770 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|-----------|-------------------|----------------------------------|---|---|---|
| | | | Displacement NatureScot Upper (30/3) (with Berwick Bank) | 32.72 | 0.5940 |
| | | | Displacement NatureScot Upper (30/3) (without Berwick Bank) | 28.11 | 0.5100 |
| | | | Displacement NatureScot Lower (30/1) (with Berwick Bank) | 10.91 | 0.1980 |
| | | | Displacement NatureScot Lower (30/1) (without Berwick Bank) | 9.37 | 0.1700 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 75.41 | 1.3687 |
| | | | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 65.40 | 1.1869 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 53.60 | 0.9728 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 42.69 | 0.7750 |
| Guillemot | Cape Wrath SPA | 51,066 | Displacement NatureScot Upper (60/5/3) | 19.70 | 0.0386 |
| | Flannan Isles SPA | 7,547 | Displacement NatureScot Upper (60/5/3) | 2.27 | 0.0301 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|--------------------------------|----------------------------------|---|---|---|
| | Handa SPA | 73,250 | Displacement NatureScot Upper (60/5/3) | 29.73 | 0.0406 |
| | North Rona and Sula Sgeir SPA | 10,354 | Displacement NatureScot Upper (60/5/3) | 3.29 | 0.0317 |
| | Sule Skerry and Sule Stack SPA | 12,060 | Displacement NatureScot Upper (60/5/3) | 15.47 | 0.1283 |
| | | | Displacement NatureScot Lower (60/3/1) | 5.56 | 0.0461 |
| | | | Displacement Applicant (50/1/1) | 4.13 | 0.0342 |
| Puffin | Cape Wrath SPA | 4,488 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 3.46 | 0.0770 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 3.46 | 0.0770 |
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 2.04 | 0.0455 |
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 2.04 | 0.0455 |
| | Flannan Isles SPA | 98,944 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 38.37 | 0.0388 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 38.36 | 0.0388 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|--------------------------------|----------------------------------|---|---|---|
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 22.69 | 0.0229 |
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 22.68 | 0.0229 |
| | Shiant Isles SPA | 129,390 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 35.86 | 0.0277 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 35.77 | 0.0276 |
| | St Kilda SPA | 197,586 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 50.87 | 0.0257 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 50.67 | 0.0256 |
| | Sule Skerry and Sule Stack SPA | 95,484 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 109.83 | 0.1150 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 109.75 | 0.1149 |
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 64.63 | 0.0677 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|-----------|-------------------|----------------------------------|---|---|---|
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 64.61 | 0.0677 |
| Razorbill | Cape Wrath SPA | 4,350 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 5.94 | 0.1366 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 5.85 | 0.1345 |
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 2.45 | 0.0546 |
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 2.42 | 0.0557 |
| | | | Displacement Applicant (50/1/1) (with Berwick Bank) | 1.45 | 0.0334 |
| | | | Displacement Applicant (50/1/1) (without Berwick Bank) | 1.43 | 0.0328 |
| | Flannan Isles SPA | 1,532 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 2.94 | 0.1920 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 2.90 | 0.1891 |
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 1.21 | 0.0788 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|---------------------------|----------------------------------|---|---|---|
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 1.19 | 0.0778 |
| | | | Displacement Applicant (50/1/1) (with Berwick Bank) | 0.72 | 0.0472 |
| | | | Displacement Applicant (50/1/1) (without Berwick Bank) | 0.71 | 0.0464 |
| | Handa SPA | 10,997 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 13.61 | 0.1238 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 13.39 | 0.1218 |
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 5.42 | 0.0493 |
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 5.35 | 0.0487 |
| | | | Displacement Applicant (50/1/1) (with Berwick Bank) | 3.41 | 0.0310 |
| | | | Displacement Applicant (50/1/1) (without Berwick Bank) | 3.35 | 0.0305 |
| | Mingulay and Berneray SPA | 26,787 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 20.14 | 0.0752 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|--------------------|----------------------------------|---|---|---|
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 19.71 | 0.0736 |
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 6.71 | 0.0251 |
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 6.57 | 0.0245 |
| | | | Displacement Applicant (50/1/1) (with Berwick Bank) | 5.60 | 0.0209 |
| | | | Displacement Applicant (50/1/1) (without Berwick Bank) | 5.47 | 0.0204 |
| | Rathlin Island SPA | 30,044 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 25.38 | 0.0845 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 24.89 | 0.0829 |
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 8.47 | 0.0282 |
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 8.31 | 0.0276 |
| | | | Displacement Applicant (50/1/1) (with Berwick Bank) | 7.05 | 0.0234 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|---|----------------------------------|---|---|--|
| | | | Displacement Applicant (50/1/1) (without Berwick Bank) | 6.91 | 0.0230 |
| | Shiant Isles SPA | 10,759 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 10.54 | 0.0980 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 10.36 | 0.0963 |
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 4.07 | 0.0378 |
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 4.01 | 0.0372 |
| | | | Displacement Applicant (50/1/1) (with Berwick Bank) | 2.70 | 0.0251 |
| | | | Displacement Applicant (50/1/1) (without Berwick Bank) | 2.65 | 0.0246 |
| | | | Skomer, Skokholm and the Seas off Pembrokeshire SPA | 15,975 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 13.01 | | | 0.0814 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 5.42 | | | 0.0339 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|--------------------|---------------------|----------------------------------|---|---|---|
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 5.35 | 0.0335 |
| | | | Displacement Applicant (50/1/1) (with Berwick Bank) | 3.24 | 0.0203 |
| | St Kilda SPA | 1,099 | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 3.48 | 0.3168 |
| | | | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 3.41 | 0.3102 |
| | | | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 1.19 | 0.1079 |
| | | | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 1.16 | 0.1057 |
| | | | Displacement Applicant (50/1/1) (with Berwick Bank) | 0.96 | 0.0871 |
| | | | Displacement Applicant (50/1/1) (without Berwick Bank) | 0.94 | 0.0852 |
| Red-throated diver | Lewis Peatlands SPA | 160 | Displacement NatureScot and Applicant (100/10) | 0.83 | 0.517 |
| Gannet | Ailsa Craig SPA | 66,452 | Collision only (with Berwick Bank) | 33.88 | 0.0510 |
| | | | Collision only (without Berwick Bank) | 32.24 | 0.0485 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|-------------------|----------------------------------|---|---|---|
| | | | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 42.72 | 0.0643 |
| | | | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 41.24 | 0.0621 |
| | | | Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 14.24 | 0.0214 |
| | | | Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 13.75 | 0.0207 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 76.60 | 0.1153 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 73.48 | 0.1106 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 48.12 | 0.0724 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 45.99 | 0.0692 |
| | Forth Islands SPA | 150,518 | Collision only | 431.31 | 0.2866 |
| | | | Displacement NatureScot Upper (70/3) | 335.88 | 0.2231 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|---|----------------------------------|--|---|---|
| Gannet | As part of Berwick Bank's consent, the impact on gannet from Forth Islands SPA would be compensated, therefore the with or without Berwick Bank impact is the same. | | Displacement NatureScot Lower (70/1) | 111.96 | 0.0744 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) | 767.19 | 0.5097 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 543.27 | 0.3609 |
| | Grassholm SPA Berwick Bank has no connectivity with Grassholm SPA year-round and therefore is not included as a with/without option. | 72,022 | Collision only | 22.54 | 0.0313 |
| | | | Displacement NatureScot Upper (70/3) | 31.14 | 0.0432 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) | 53.68 | 0.0745 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 32.92 | 0.0457 |
| | Hermaness, Saxa Vord and Valla Field SPA As part of Berwick Bank's consent, the impact on gannet from Hermaness, Saxa Vord and Valla Field | 59,124 | Collision only | 22.01 | 0.0372 |
| | | | Displacement NatureScot Upper (70/3) | 76.02 | 0.1286 |
| | | | Displacement NatureScot Lower (70/1) | 25.34 | 0.0429 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) | 98.03 | 0.1658 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|--|----------------------------------|---|---|---|
| | SPA would be compensated, therefore the with or without Berwick Bank impact is the same. | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 47.35 | 0.0801 |
| | North Rona and Sula Sgeir SPA | 24,542 | Collision only (with Berwick Bank) | 9.16 | 0.0373 |
| | | | Collision only (without Berwick Bank) | 9.14 | 0.0372 |
| | | | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 10.00 | 0.0407 |
| | | | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 9.77 | 0.0398 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 19.16 | 0.0781 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 18.91 | 0.0771 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 12.49 | 0.0509 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 12.40 | 0.0505 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|----------|----------------------------------|---|---|---|
| | Noss SPA | 27,530 | Collision only (with Berwick Bank) | 13.70 | 0.0498 |
| | | | Collision only (without Berwick Bank) | 13.16 | 0.0478 |
| | | | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 33.75 | 0.1226 |
| | | | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 32.26 | 0.1172 |
| | | | Displacement NatureScot Lower (70/1) (with Berwick Bank) | 11.25 | 0.0409 |
| | | | Displacement NatureScot Lower (70/1) (without Berwick Bank) | 10.75 | 0.0391 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 47.45 | 0.1723 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 45.56 | 0.1655 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 24.95 | 0.0906 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 23.91 | 0.0869 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|--------------------------------|----------------------------------|---|---|---|
| | St Kilda SPA | 120,580 | Collision only (with Berwick Bank) | 29.56 | 0.0245 |
| | | | Collision only (without Berwick Bank) | 29.22 | 0.0242 |
| | | | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 42.36 | 0.0351 |
| | | | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 41.09 | 0.0341 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 71.91 | 0.0596 |
| | | | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 70.31 | 0.0583 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 43.68 | 0.0362 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 42.92 | 0.0356 |
| | Sule Skerry and Sule Stack SPA | 18,130 | Collision only (with Berwick Bank) | 27.10 | 0.1495 |
| | | | Collision only (without Berwick Bank) | 26.69 | 0.1472 |
| | | | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 18.14 | 0.1001 |

| Species | SPA | SPA Population (Breeding Adults) | Impact Scenario (see Table 2-3 and Table 2-4) | Annual Mortality Estimate (Adult Birds) | Percentage Point Decrease in Adult Survival |
|---------|-----|----------------------------------|---|---|---|
| | | | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 17.98 | 0.0992 |
| | | | Displacement NatureScot Lower (70/1) (with Berwick Bank) | 6.05 | 0.0334 |
| | | | Displacement NatureScot Lower (70/1) (without Berwick Bank) | 5.99 | 0.0331 |
| | | | Combined Collisions and Displacement NatureScot Upper (with Berwick Bank) | 45.24 | 0.2495 |
| | | | Combined Collisions and Displacement NatureScot Upper (without Berwick Bank) | 44.67 | 0.2464 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 33.15 | 0.1828 |
| | | | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 32.68 | 0.1803 |

4 OFFSHORE PROJECT ALONE ASSESSMENT OUTPUTS

4.1 OFFSHORE PROJECT ALONE ASSESSMENT OUTPUTS OVERVIEW

- 4.1.1.1 The results of the Offshore Project alone PVAs for impacts are presented for each species, SPA and scenario listed in **Table 3-1**. These results are set out within Section 4.2, and reflect impacts from the first full year of operation (2034) following the construction phase (finishing in 2033) and cover the expected 35-year operational lifespan of the Offshore Project. The 35-year PVAs form the basis for the assessment conclusions. In accordance with NatureScot guidance (NatureScot, 2023b), results for 50-year time periods are also provided within Section 4.3, although they are not used to inform the conclusions of the assessment.
- 4.1.1.2 The baseline 'unimpacted' scenarios (i.e. assuming no additional mortality other than baseline mortality exists) are also shown for comparison purposes. Graphs relating to population size, CPS, and CGR for each impact scenario for the lifetime of the Offshore Project are also presented for the 35-year period in line with guidance (NatureScot, 2023b).
- 4.1.1.3 All plates which depict the population projection have been modelled from 2024 (before the impact starts) to 2083 (50 years following the cessation of the construction phase), these plates are only presented in Section 4.2 (35-year results) and are not repeated in Section 4.3 (50-year results).
- 4.1.1.4 Within the population project plates the unimpacted population is shown in blue, with the impacted population overlaid in red. The blue shading represents the 95% confidence interval for the unimpacted population, while the red shading represents the 95% confidence interval for the impacted population. Where the red and blue overlap, the combined colour (purple) indicates a similar population projection.
- 4.1.1.5 Within the GCR and CPS plates the central line represents the median, the shaded box represents 1 standard deviation above and below the median.

4.2 RESULTS: AFTER 35 YEARS

4.2.1 GUILLEMOT

- 4.2.1.1 The results of the PVA runs for impacts from the Offshore Project alone to the guillemot populations (as set out in **Table 3-1**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 4-1**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 4-1** to **Plate 4-12**.

Table 4-1 Offshore Project Alone PVA Outputs for Guillemot After 35 Year

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 35 Years) | | | | Quantiles | |
|-------------------------------|--|--|---------------------------|---------------------------------------|------------|--|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted and Impacted) (%) | Reduction In Population Size (Between Unimpacted and Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 10.80 | 1.0259 | 0.9998 | 0.9914 | 0.02 | 0.86 | 48.06 | 52.24 |
| Flannan Isles SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 2.28 | 1.0257 | 0.9996 | 0.9873 | 0.04 | 1.27 | 46.20 | 52.94 |
| Handa SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 17.00 | 1.0259 | 0.9997 | 0.9909 | 0.03 | 0.91 | 47.72 | 51.94 |
| North Rona and Sula Sgeir SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 2.27 | 1.0259 | 0.9998 | 0.9910 | 0.02 | 0.90 | 47.96 | 51.64 |

4.2.1.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Displacement NatureScot Upper (60/5/3) is presented as 'Disp. Upper'.

Plate 4-1 Guillemot Population Projection over 35-50 Years at the Cape Wrath SPA.

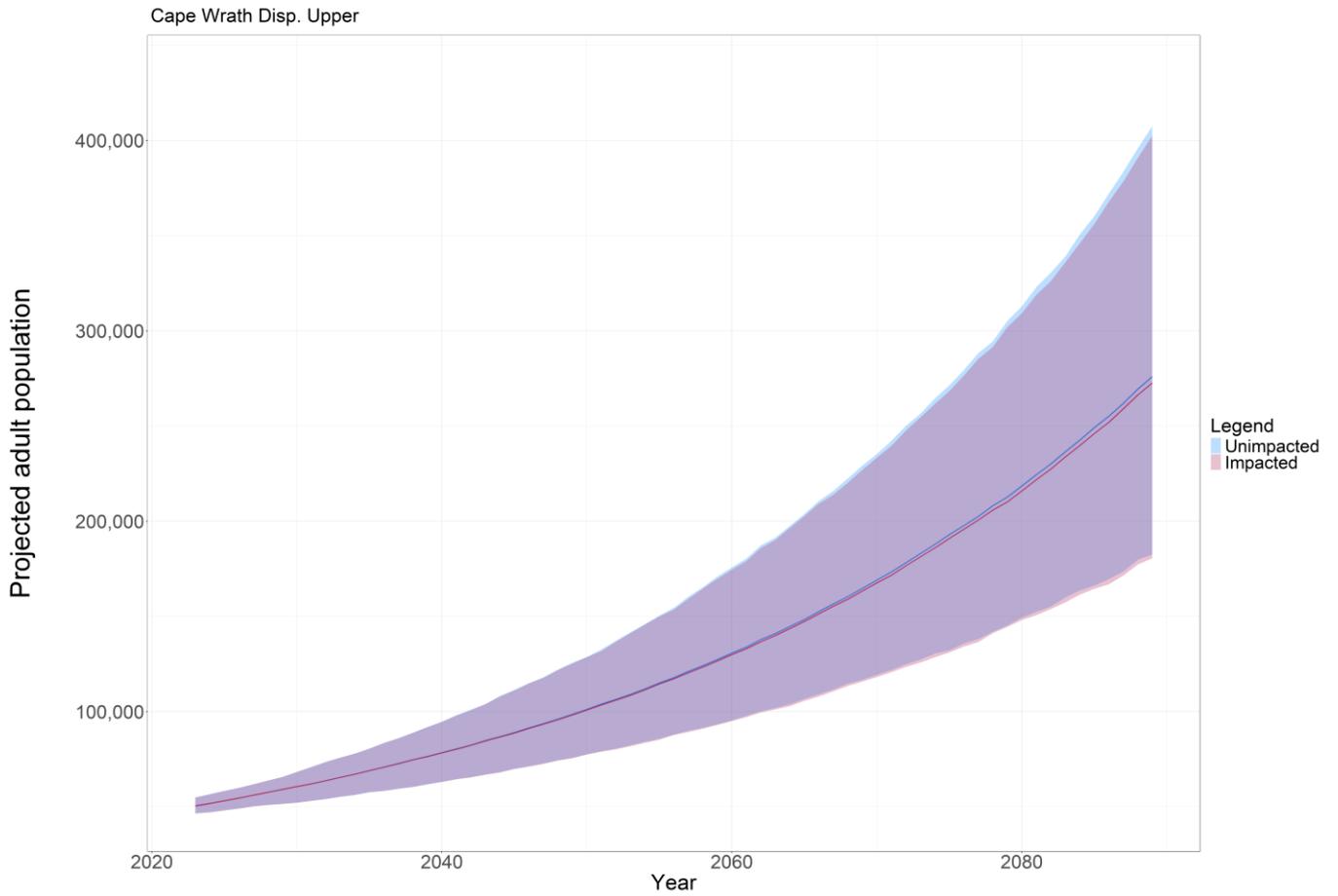


Plate 4-2 CGR after 35 Years for the Guillemot Population at the Cape Wrath SPA.

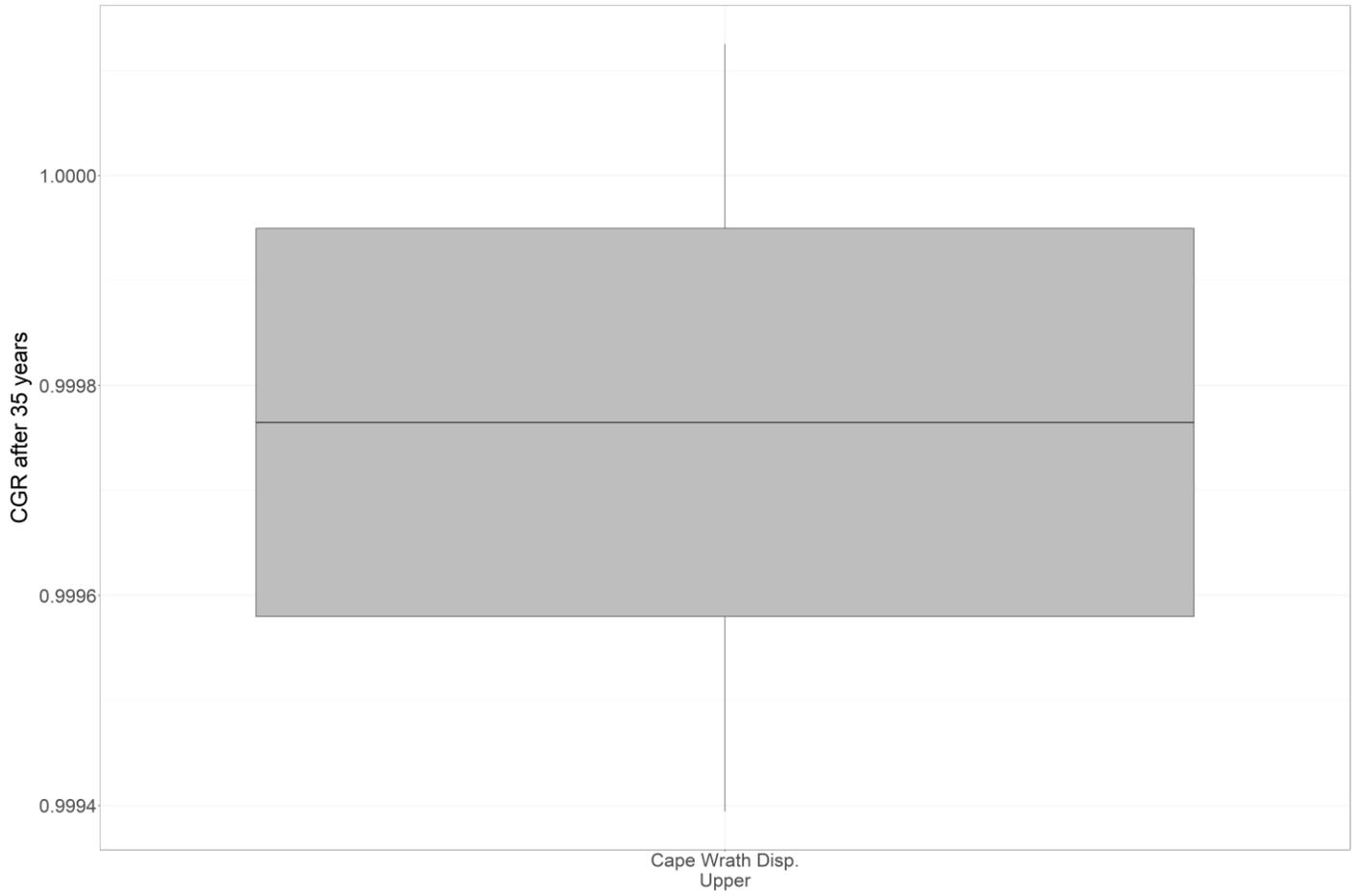


Plate 4-3 CPS after 35 Years for the Guillemot Population at the Cape Wrath SPA.

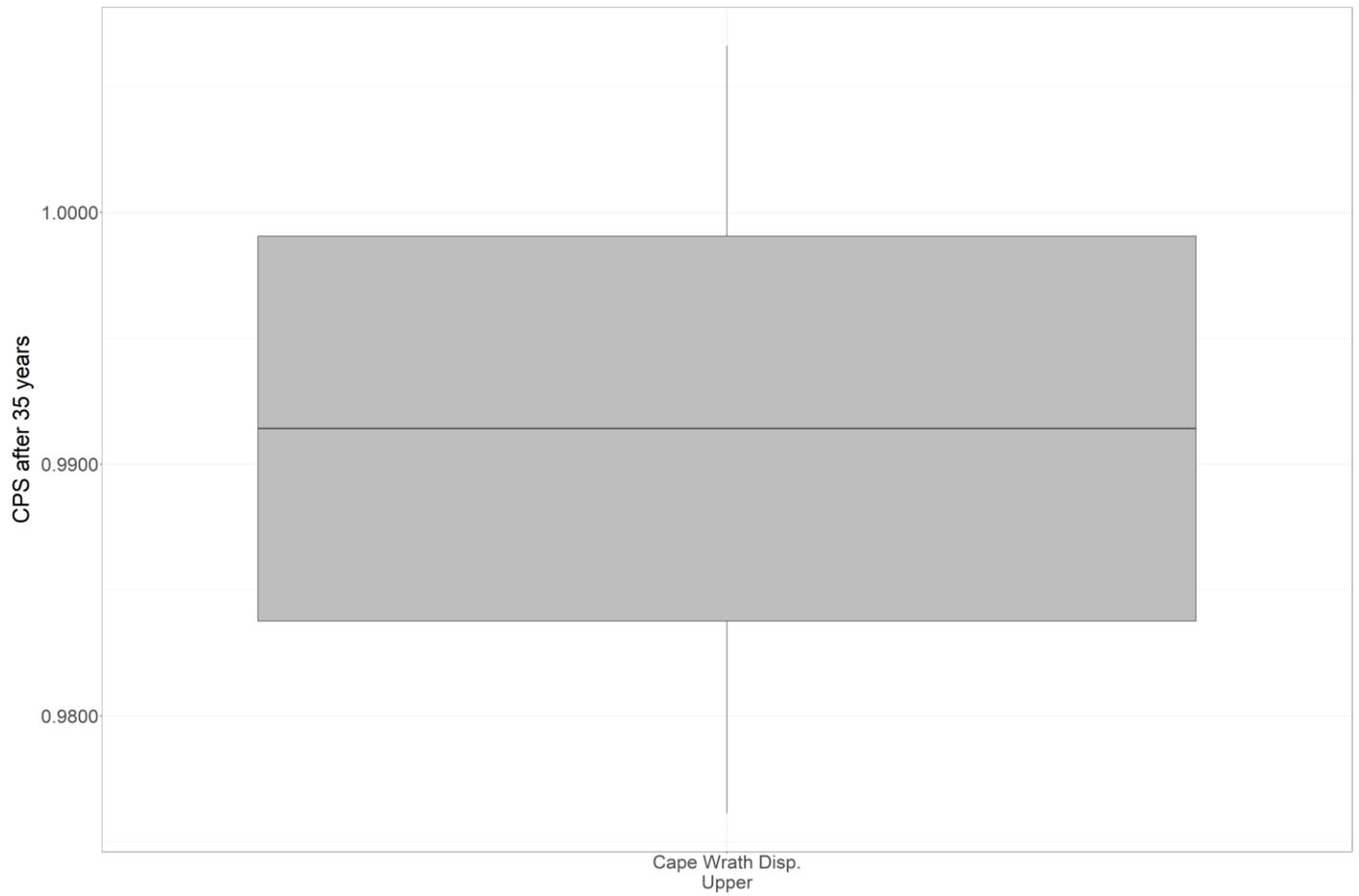


Plate 4-4 Guillemot Population Projection over 35-50 Years at the Flannan Isles SPA.

Flannan Isles Disp. Upper

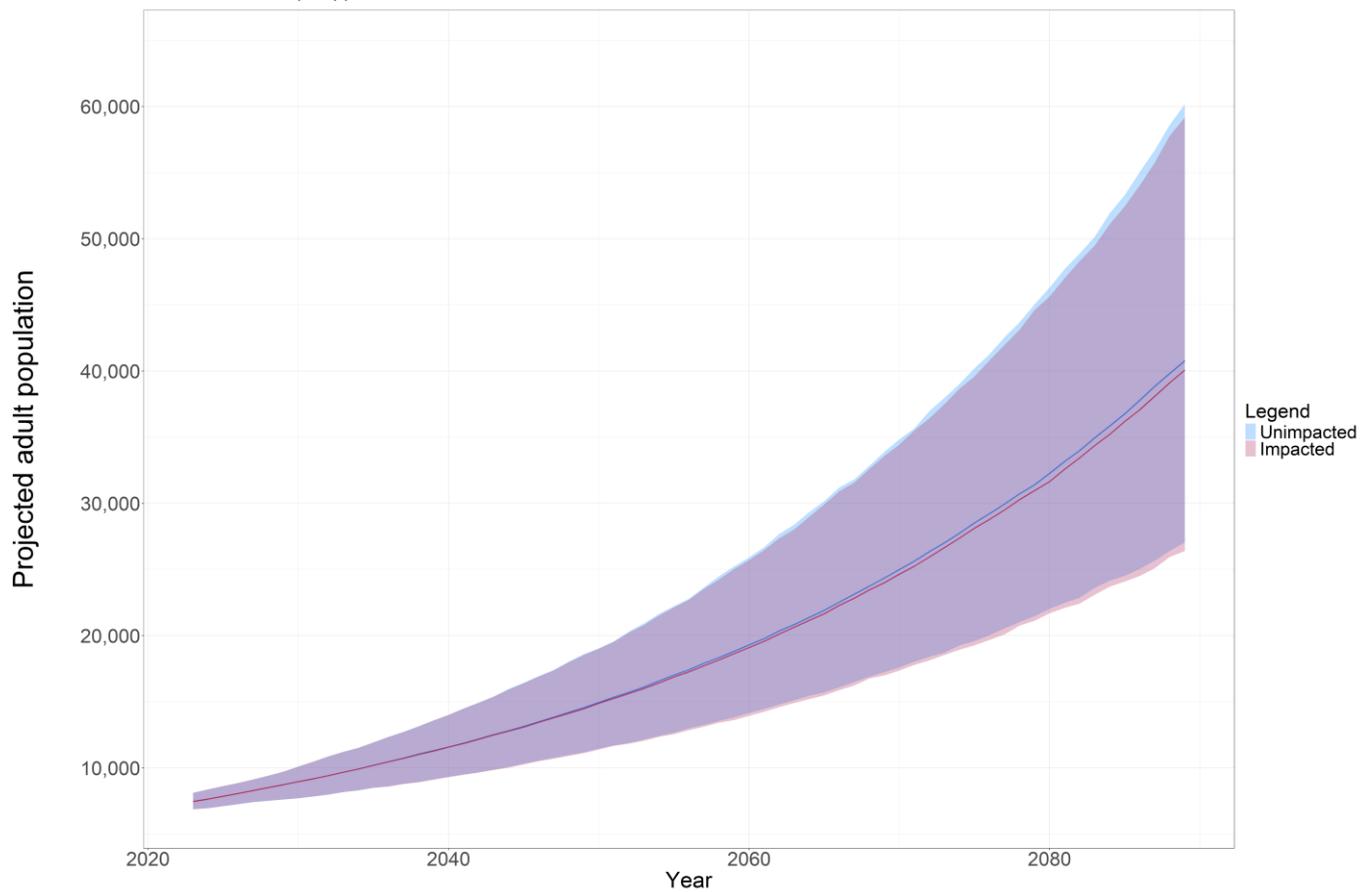


Plate 4-5 CGR after 35 Years for the Guillemot Population at the Flannan Isles SPA.

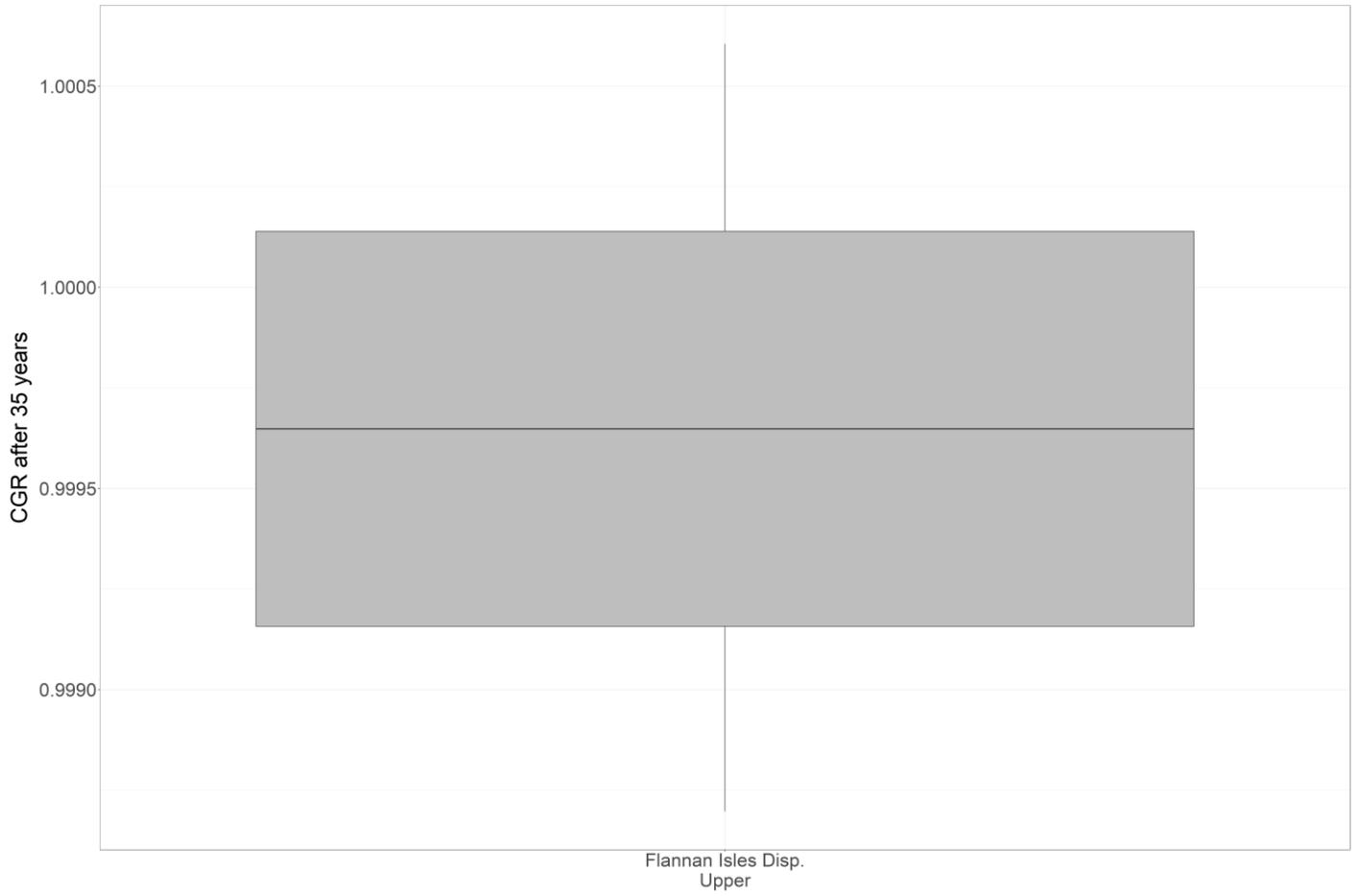


Plate 4-6 CPS after 35 Years for the Guillemot Population at the Flannan Isles SPA.

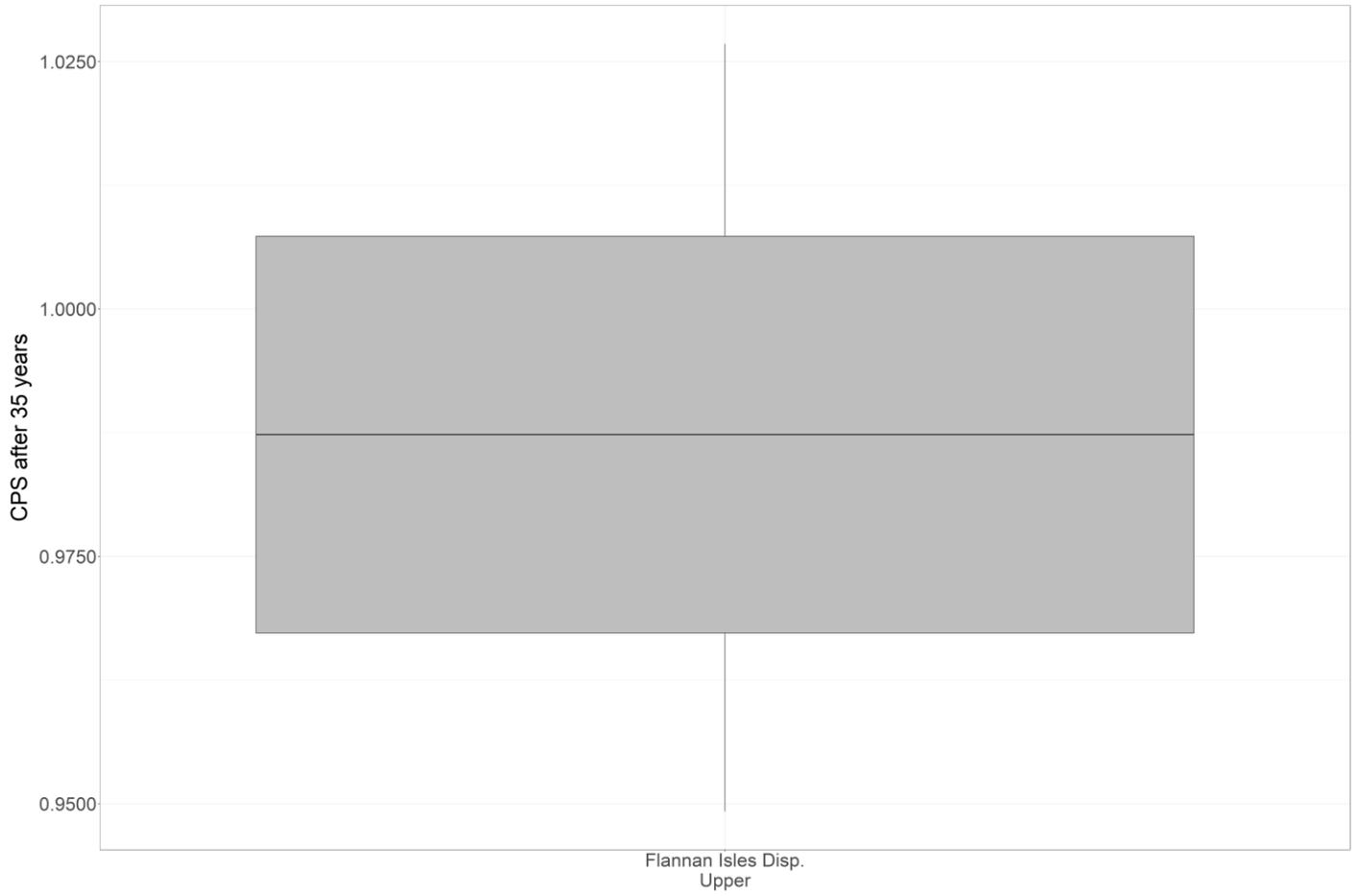


Plate 4-7 Guillemot Population Projection over 35-50 Years at the Handa SPA.

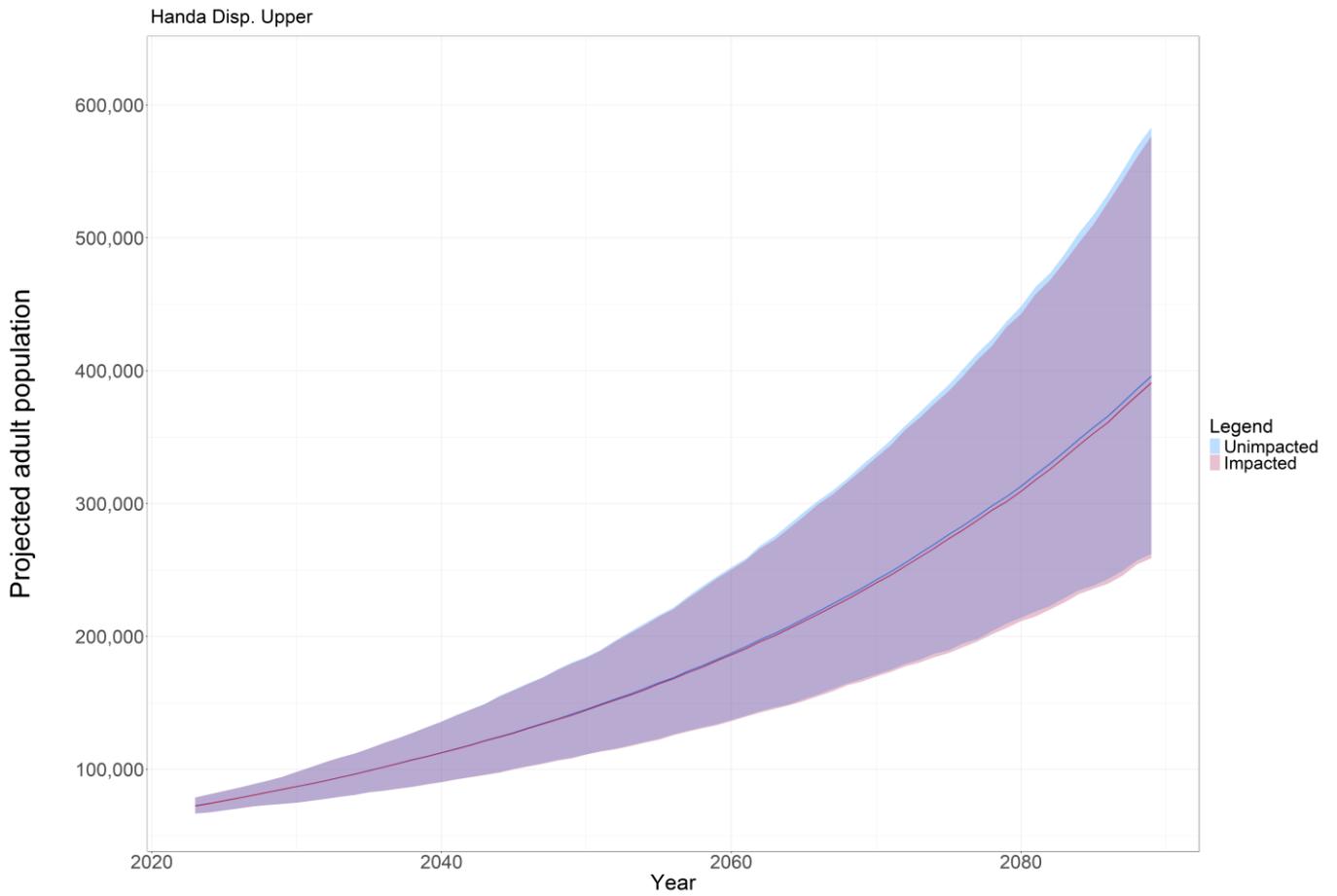


Plate 4-8 CGR after 35 Years for the Guillemot Population at the Handa SPA.



Plate 4-9 CPS after 35 Years for the Guillemot Population at the Handa SPA.

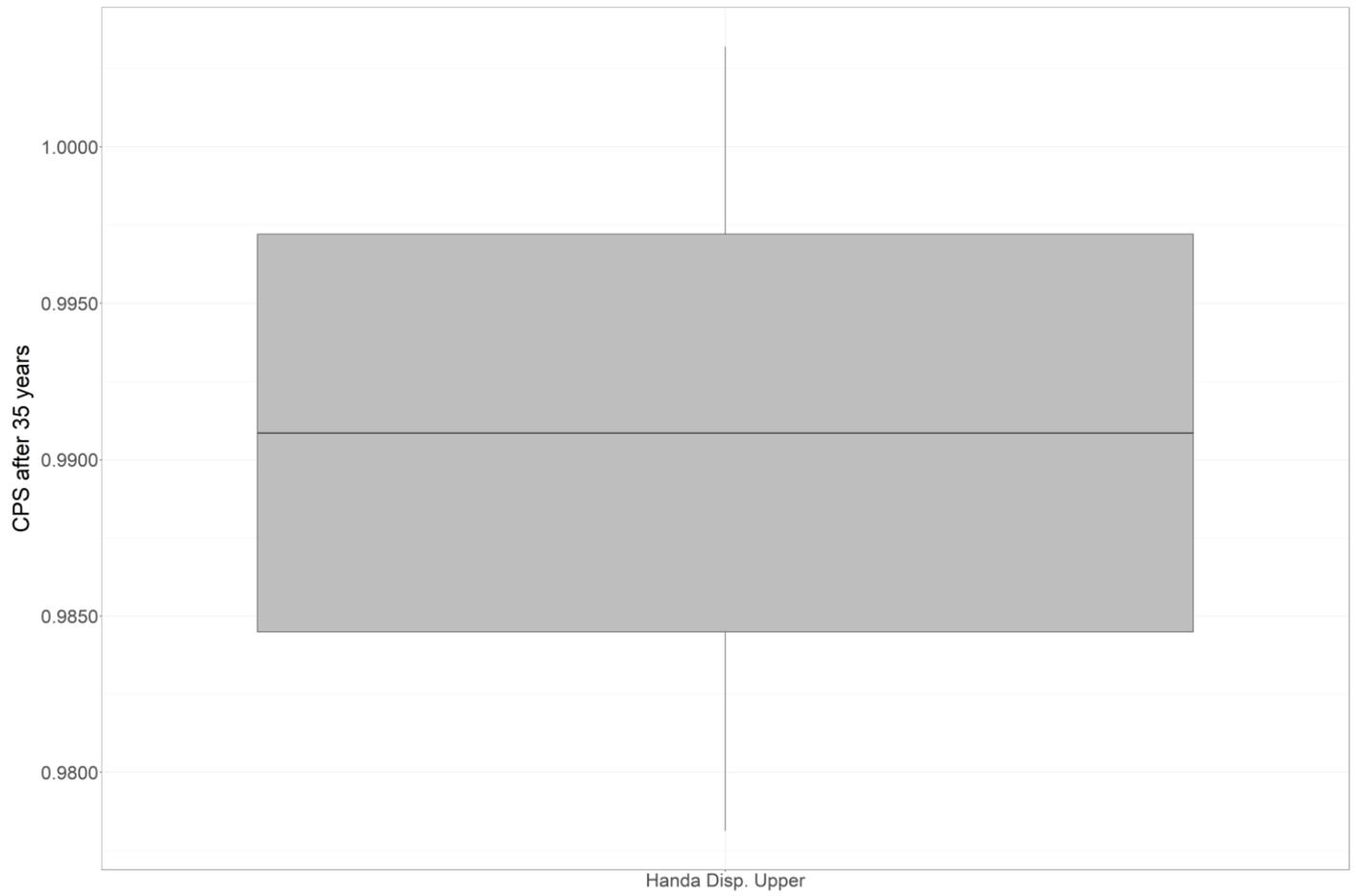


Plate 4-10 Guillemot Population Projection over 35-50 Years at the North Rona and Sula Sgeir SPA.

North Rona and Sula Sgeir Disp. Upper

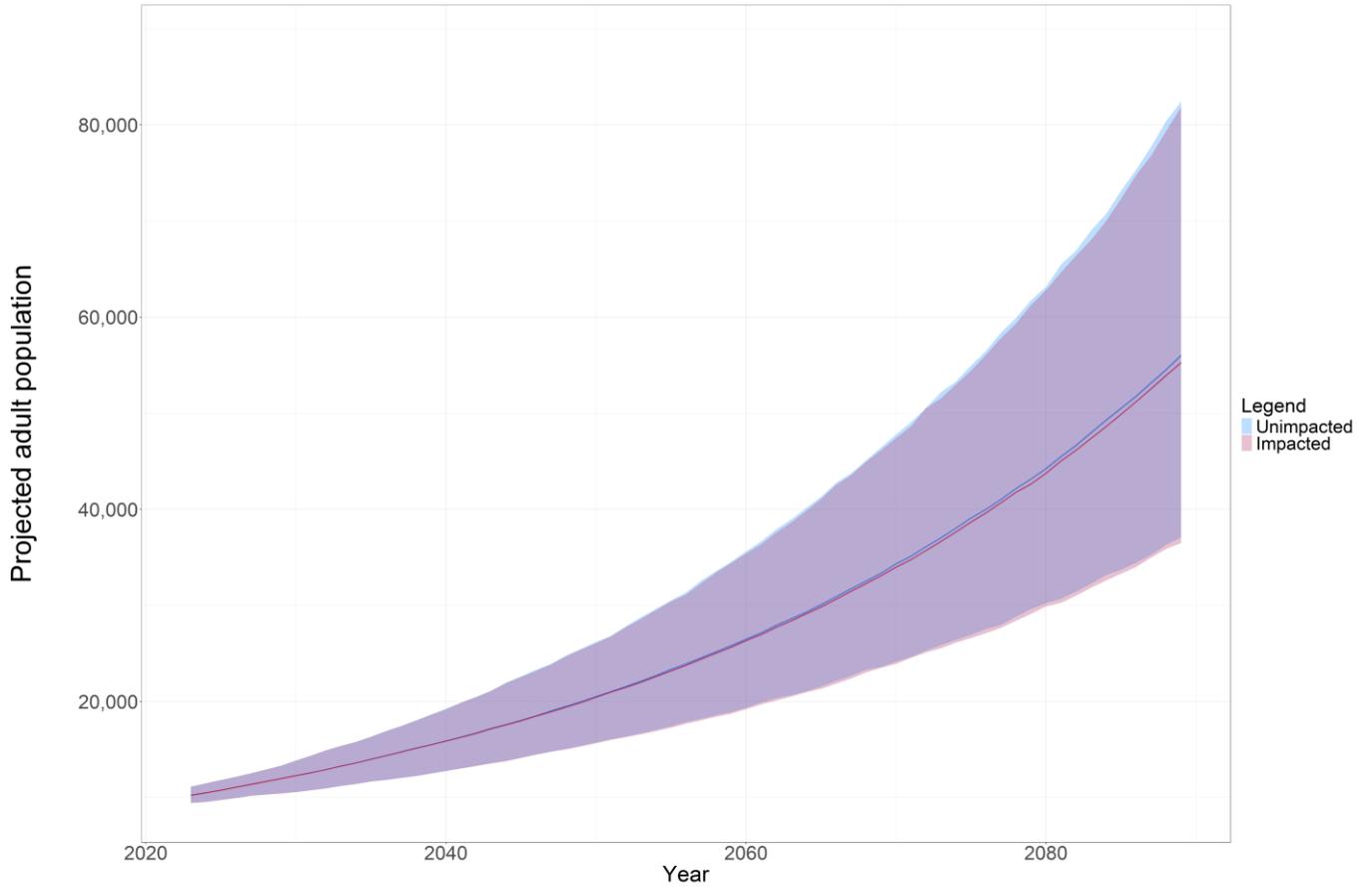


Plate 4-11 CGR after 35 Years for the Guillemot Population at the North Rona and Sula Sgeir SPA.

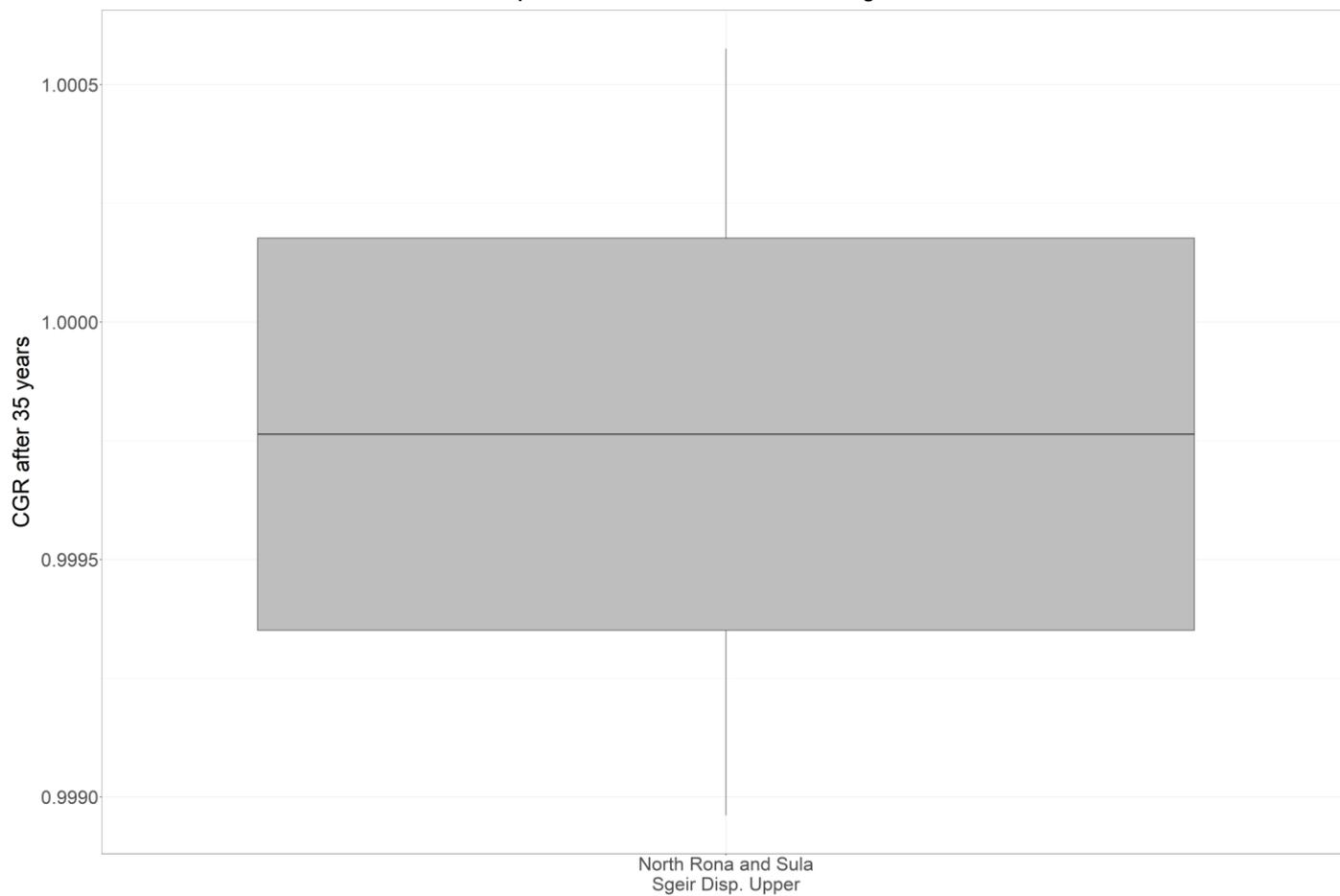
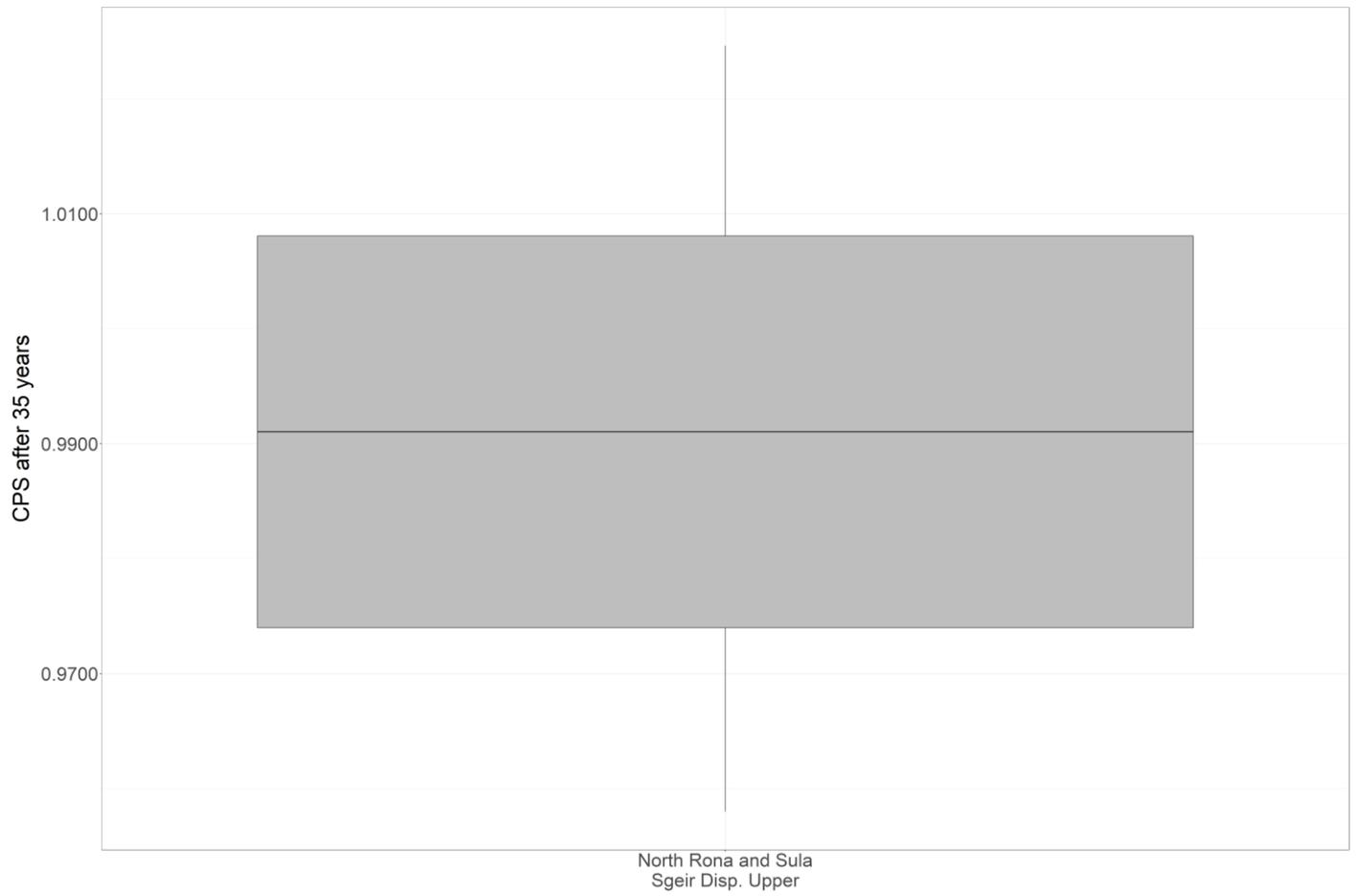


Plate 4-12 CPS after 35 Years for the Guillemot Population at the North Rona and Sula Sgeir SPA.



4.2.2 RAZORBILL

4.2.2.1 The results of the PVA runs for impacts from the Offshore Project alone to the razorbill populations (as set out in **Table 3-1**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 4-2**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 4-13** to **Plate 4-24**.

Table 4-2 Offshore Project Alone PVA Outputs for Razorbill After 35 Years

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 35 Years) | | | | Quantiles | |
|-------------------------------|--|--|---------------------------|---------------------------------------|------------|--|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Flannan Isles SPA | Baseline | 0 | 0.9763 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 0.92 | 0.9754 | 0.9992 | 0.9738 | 0.08 | 2.62 | 47.24 | 52.70 |
| | Displacement NatureScot Lower (60/3/1) | 0.53 | 0.9758 | 0.9996 | 0.9843 | 0.04 | 1.57 | 47.48 | 52.54 |
| Handa SPA | Baseline | 0 | 0.9763 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 2.94 | 0.9760 | 0.9997 | 0.9891 | 0.03 | 1.09 | 49.12 | 50.86 |
| North Rona and Sula Sgeir SPA | Baseline | 0 | 0.9763 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 0.16 | 0.9757 | 0.9996 | 0.9872 | 0.04 | 1.28 | 48.52 | 52.08 |
| | Baseline | 0 | 0.9763 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 35 Years) | | | | Quantiles | |
|------------------|--|--|---------------------------|---------------------------------------|------------|--|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Shiant Isles SPA | Displacement NatureScot Upper (60/5/3) | 2.35 | 0.9761 | 0.9997 | 0.9918 | 0.03 | 0.82 | 48.82 | 51.34 |

4.2.2.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Displacement NatureScot Upper (60/5/3) is presented as 'Disp. Upper';
- Displacement NatureScot Lower (60/3/1) is presented as 'Disp. Lower'.

Plate 4-13 Razorbill Population Projection over 35-50 Years at the Flannan Isles SPA.

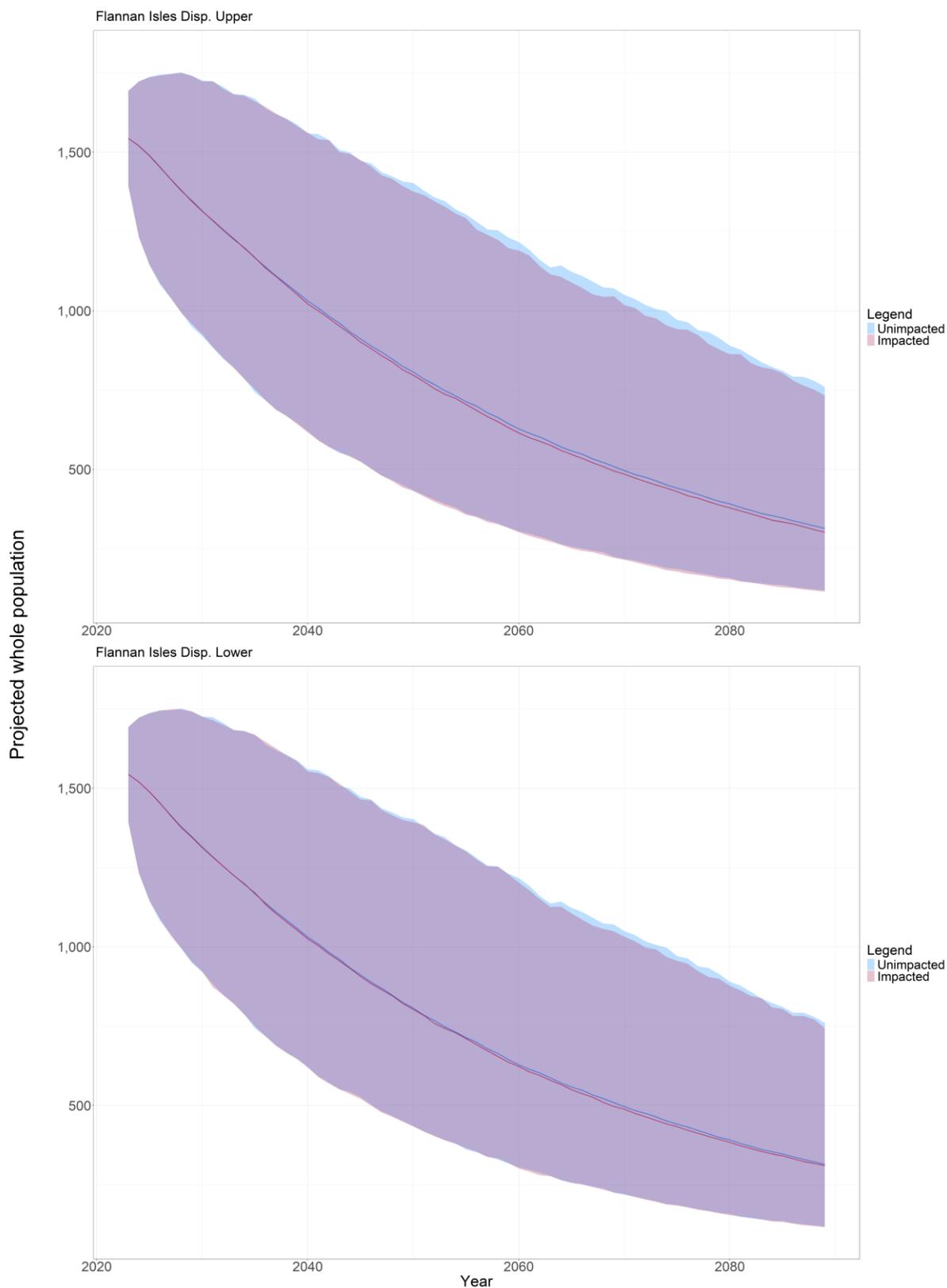


Plate 4-14 CGR after 35 Years for the Razorbill Population at the Flannan Isles SPA.

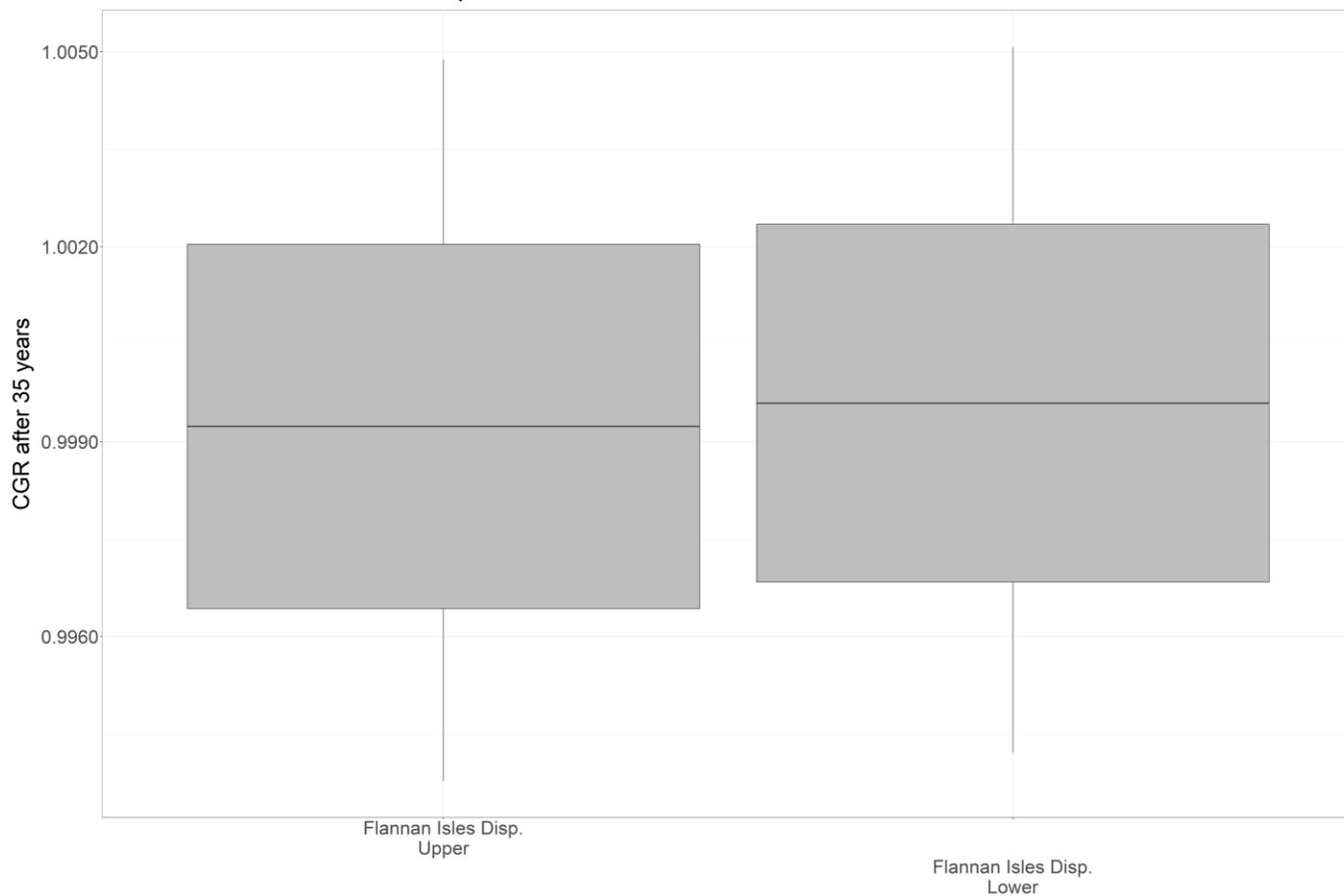


Plate 4-15 CPS after 35 Years for the Razorbill Population at the Flannan Isles SPA.

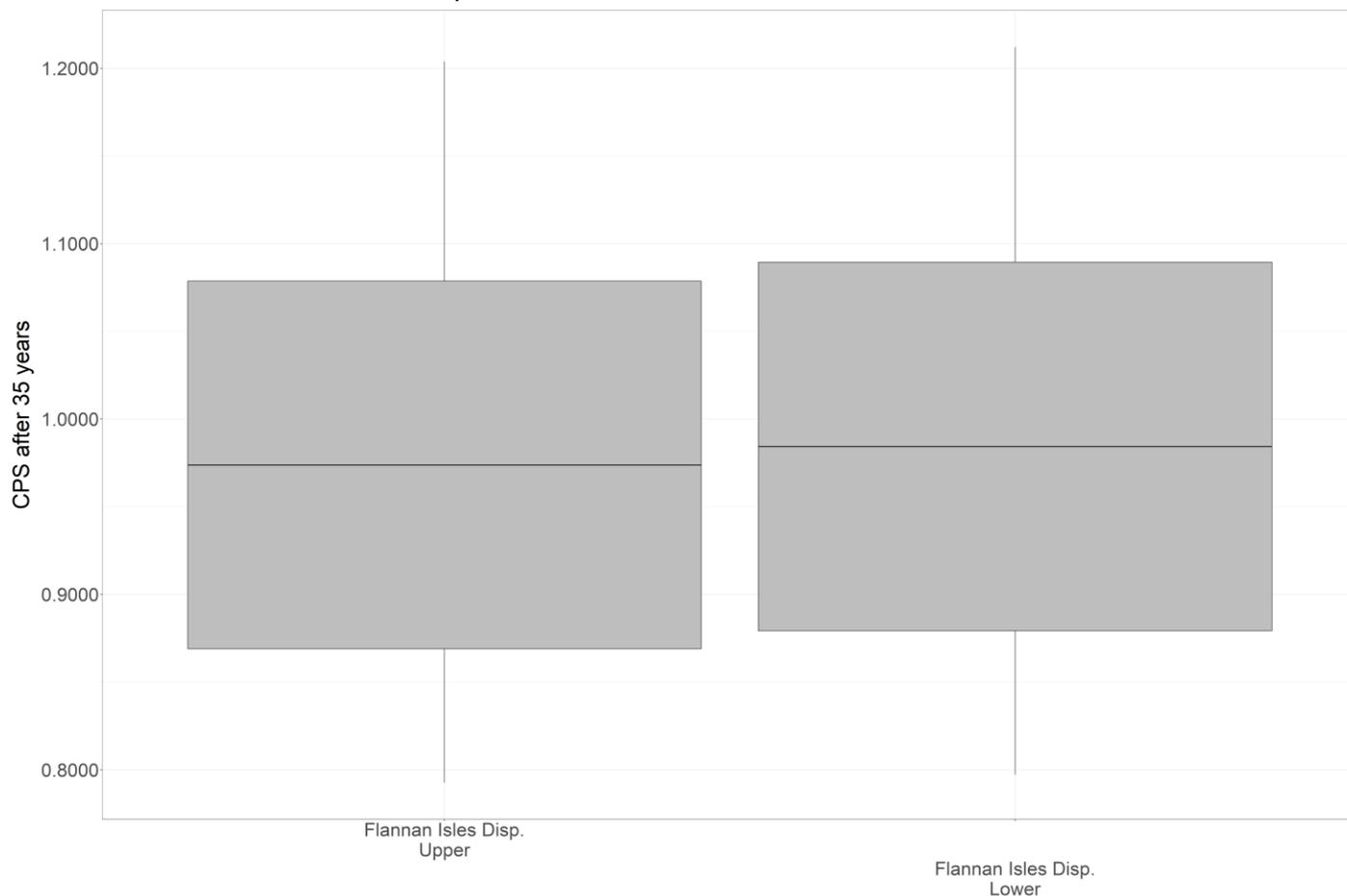


Plate 4-16 Razorbill Population Projection over 35-50 Years at the Handa SPA.

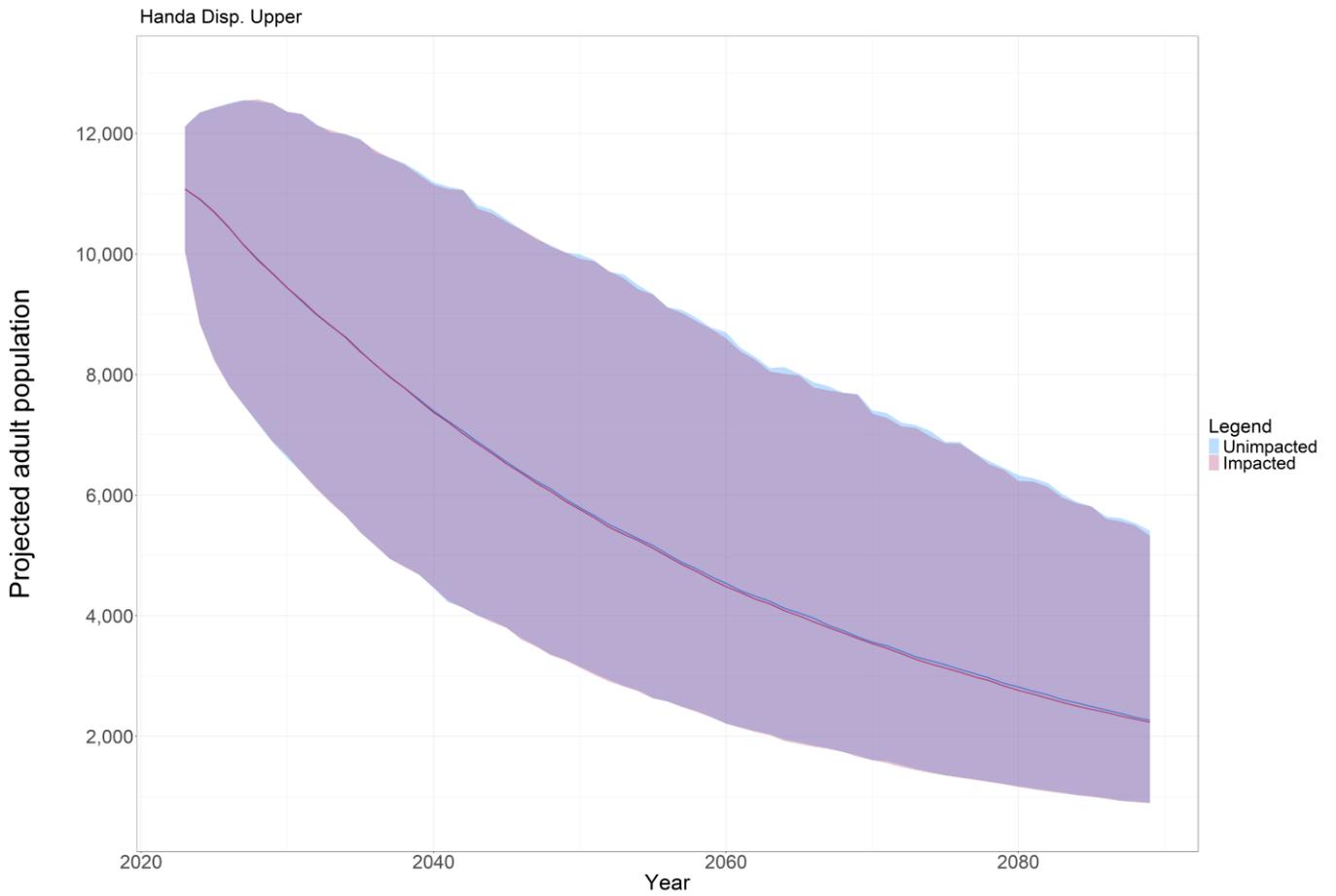


Plate 4-17 CGR after 35 Years for the Razorbill Population at the Handa SPA.

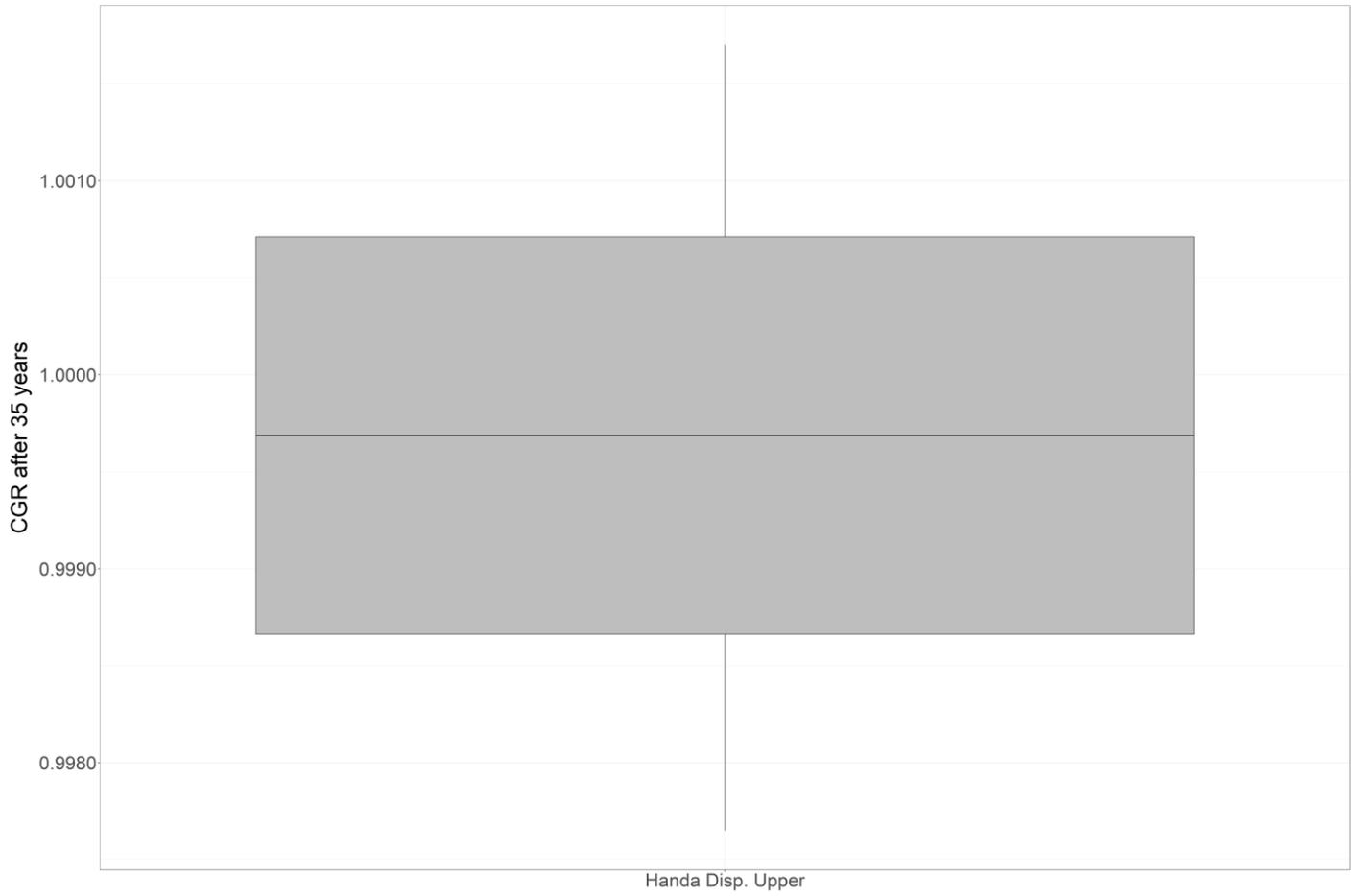


Plate 4-18 CPS after 35 Years for the Razorbill Population at the Handa SPA.

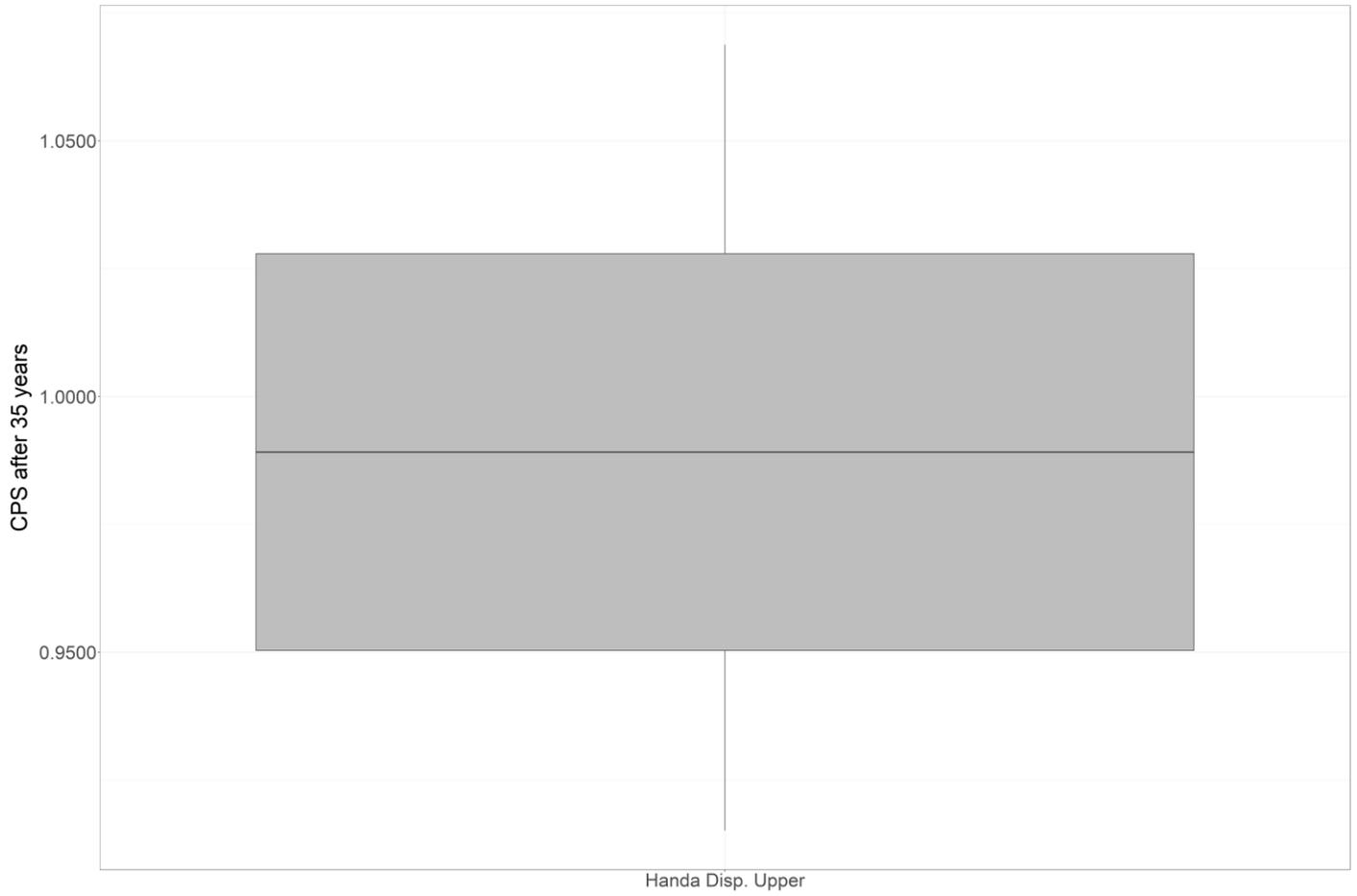


Plate 4-19 Razorbill Population Projection over 35-50 Years at the North Rona and Sula Sgeir SPA.

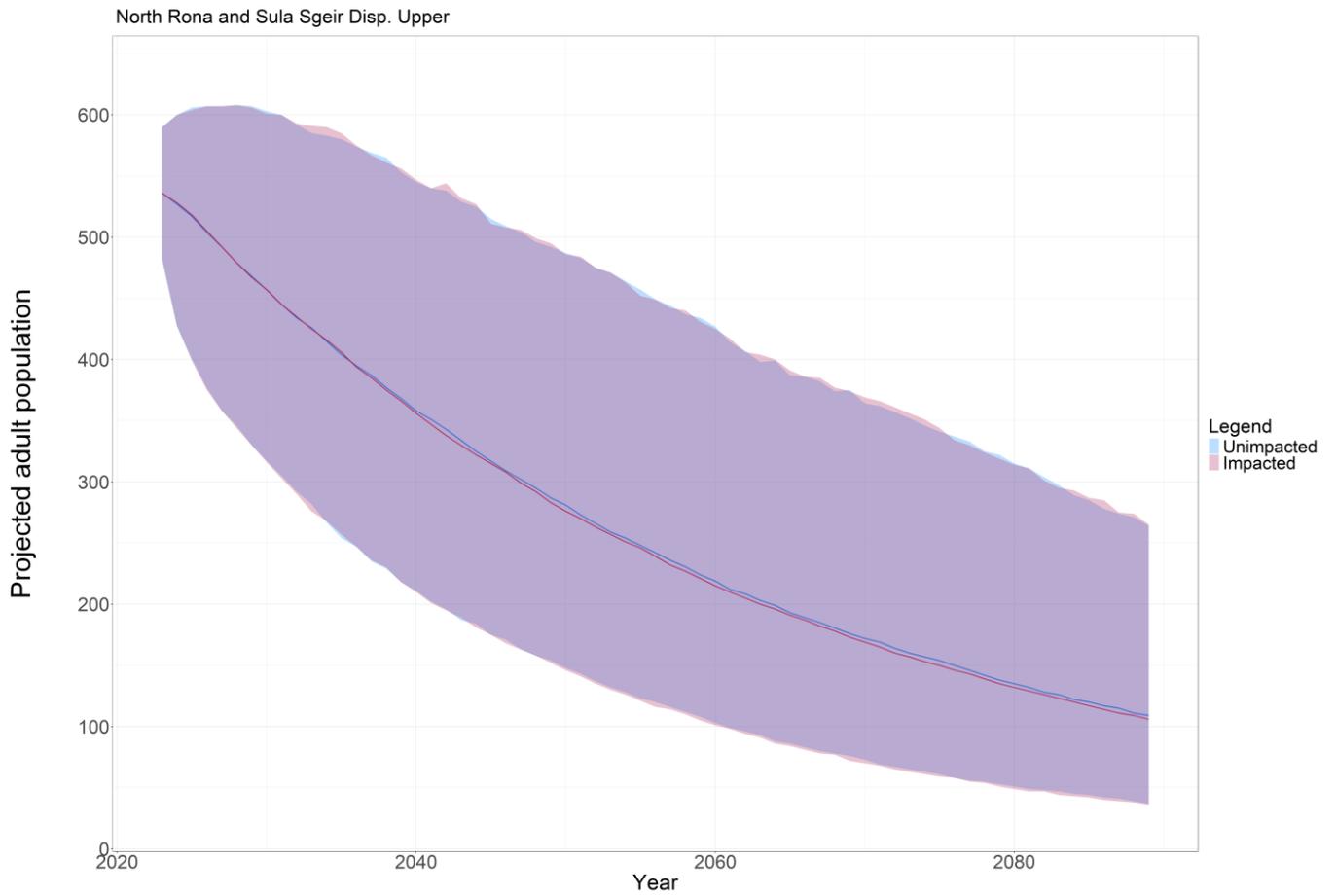


Plate 4-20 CGR after 35 Years for the Razorbill Population at the North Rona and Sula Sgeir SPA.

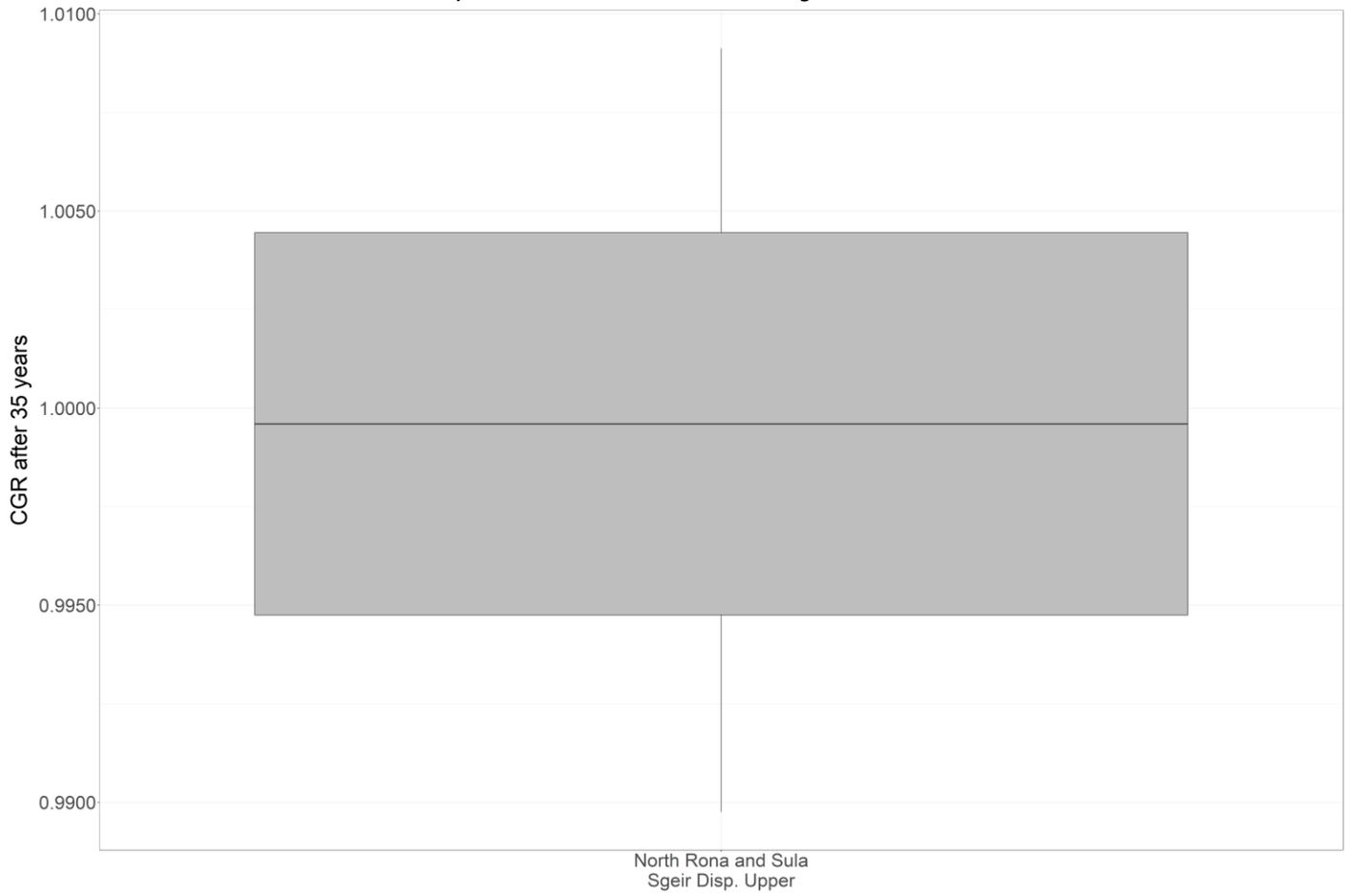


Plate 4-21 CPS after 35 Years for the Razorbill Population at the North Rona and Sula Sgeir SPA.

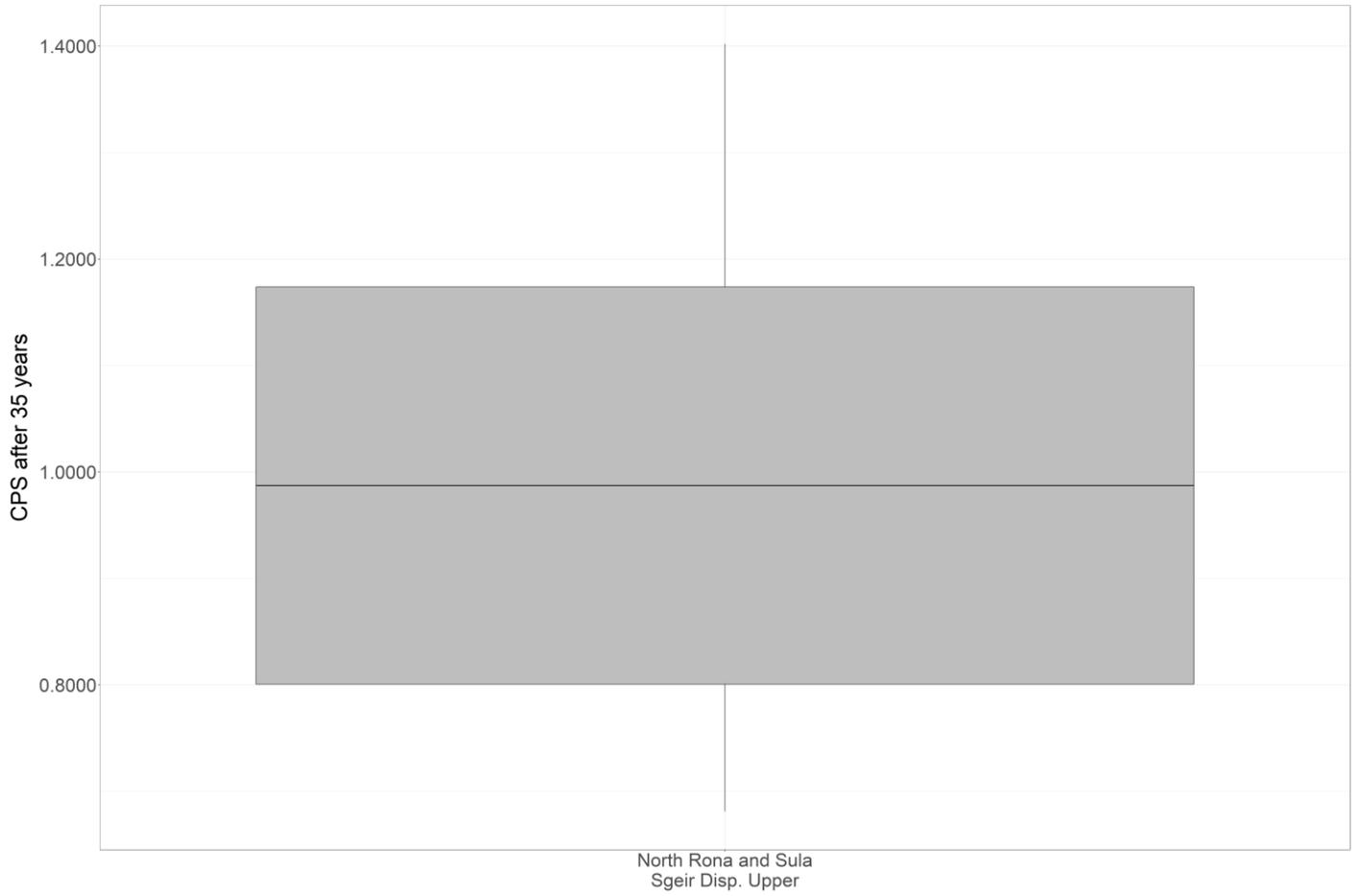


Plate 4-22 Razorbill Population Projection over 35-50 Years at the Shiant Isles SPA.

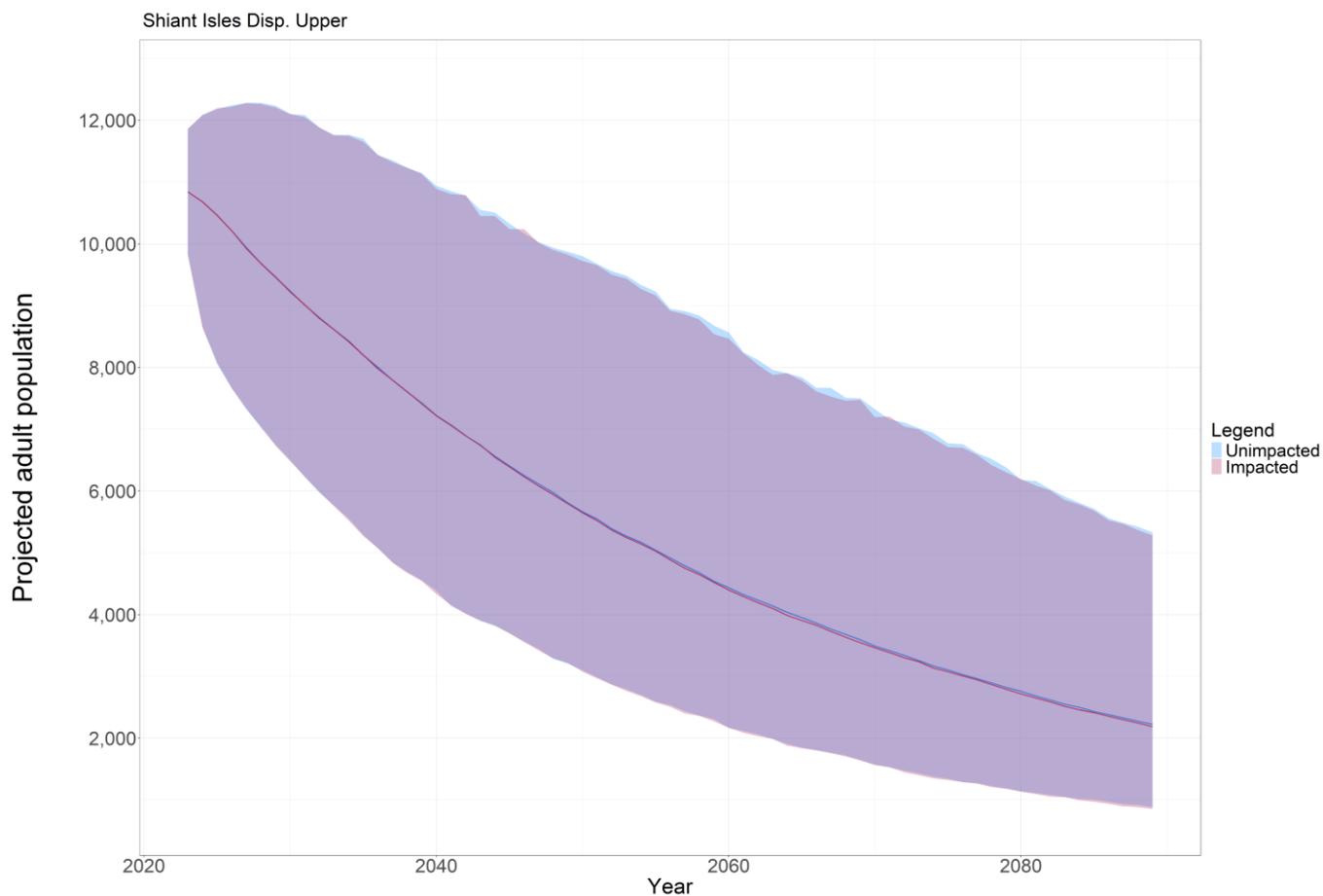


Plate 4-23 CGR after 35 Years for the Razorbill Population at the Shiant Isles SPA.

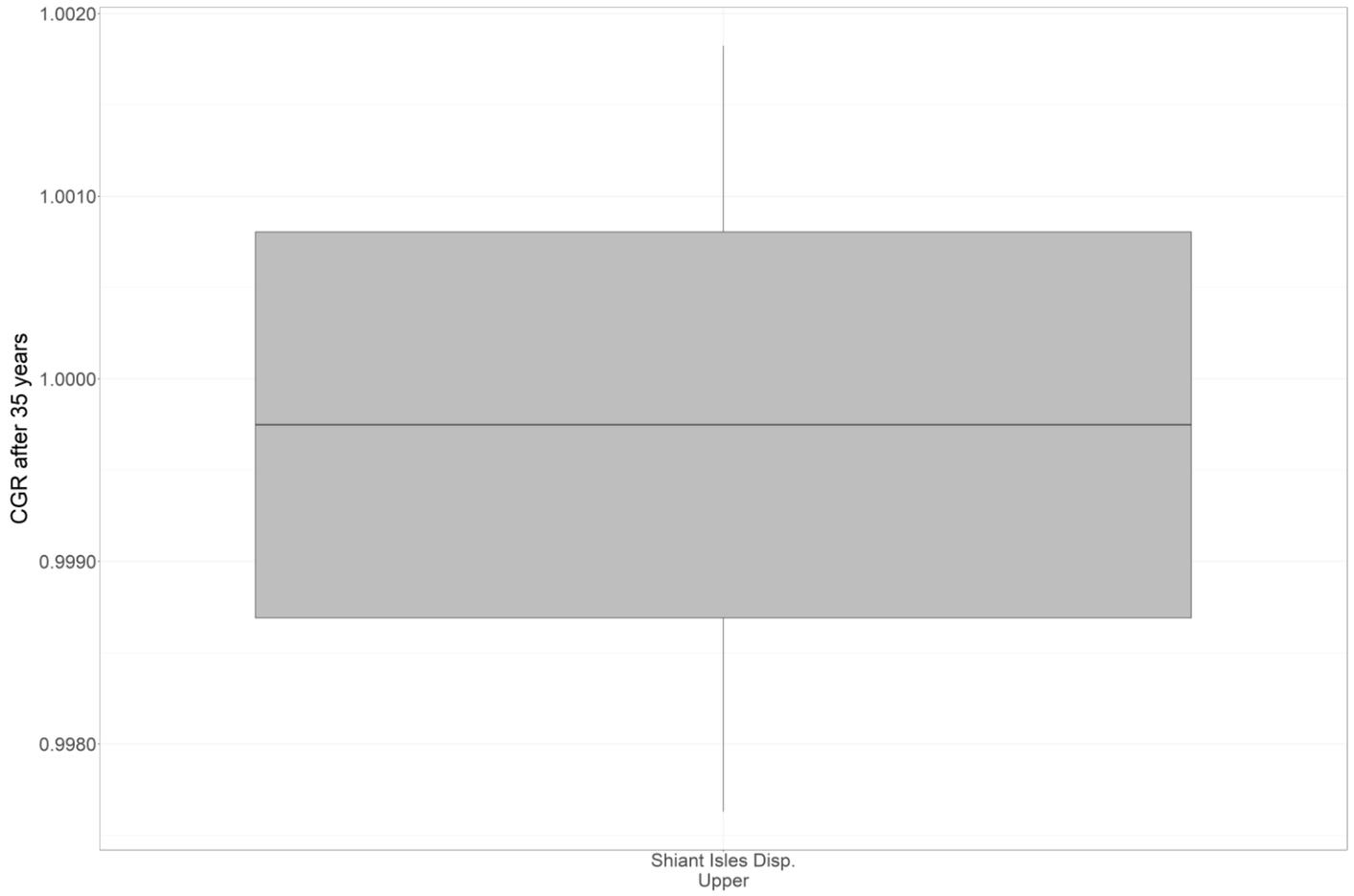
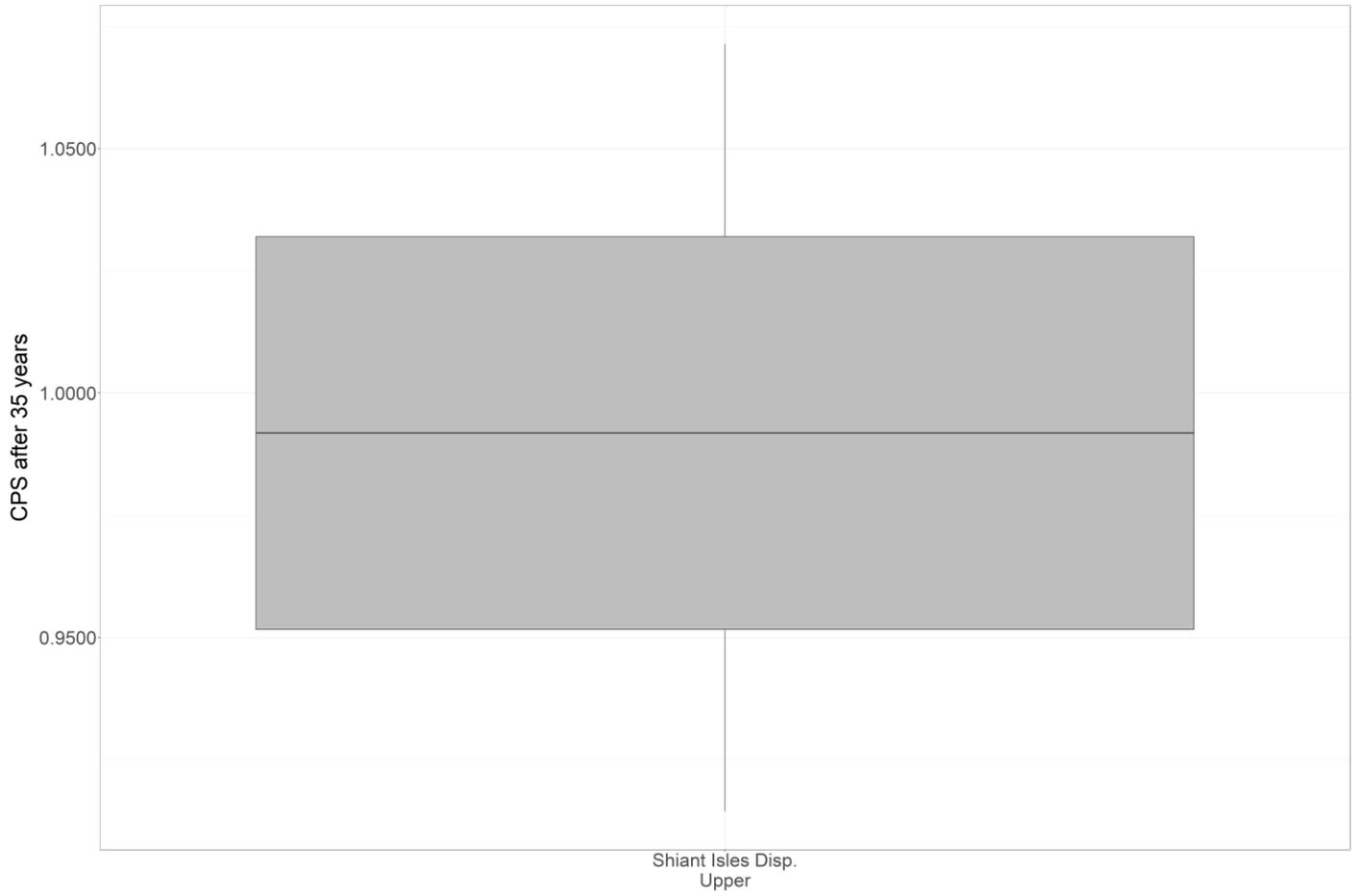


Plate 4-24 CPS after 35 Years for the Razorbill Population at the Shiant Isles SPA.



4.2.3 PUFFIN

4.2.3.1 The results of the PVA runs for impacts from the Offshore Project alone to the puffin populations (as set out in **Table 3-1**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 4-3**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 4-25** to **Plate 4-27**.

Table 4-3 Offshore Project Alone PVA Outputs for Puffin After 35 Years

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 35 Years) | | | | Quantiles | |
|-------------------|--|--|---------------------------|---------------------------------------|------------|--|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Flannan Isles SPA | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 31.99 | 0.9716 | 0.9996 | 0.9866 | 0.04 | 1.34 | 49.04 | 50.94 |

4.2.3.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Displacement NatureScot Upper (60/5/3) is presented as 'Disp. Upper'.



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Plate 4-25 Puffin Population Projection over 35-50 Years at the Flannan Isles SPA.

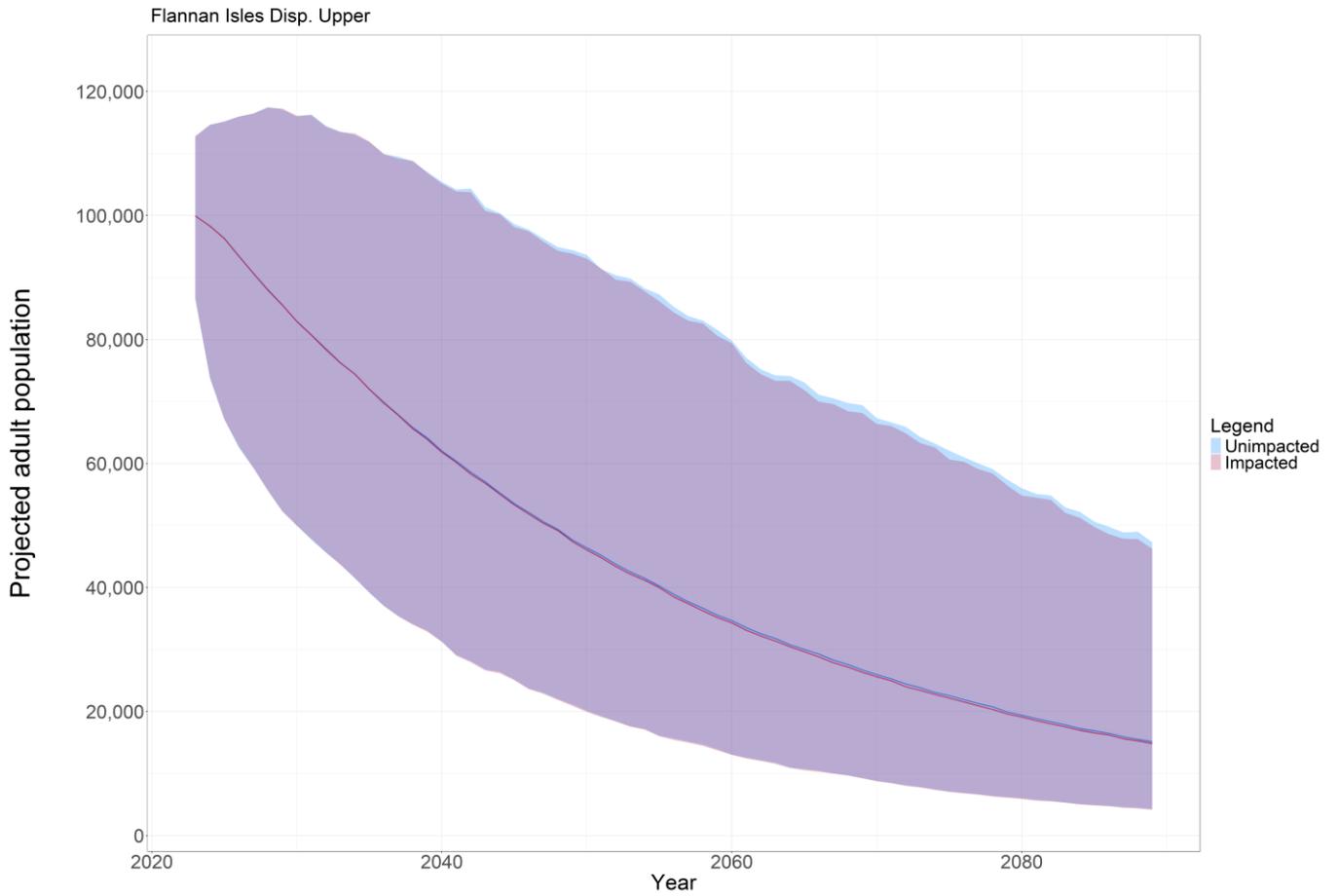


Plate 4-26 CGR after 35 Years for the Puffin Population at the Flannan Isles SPA.

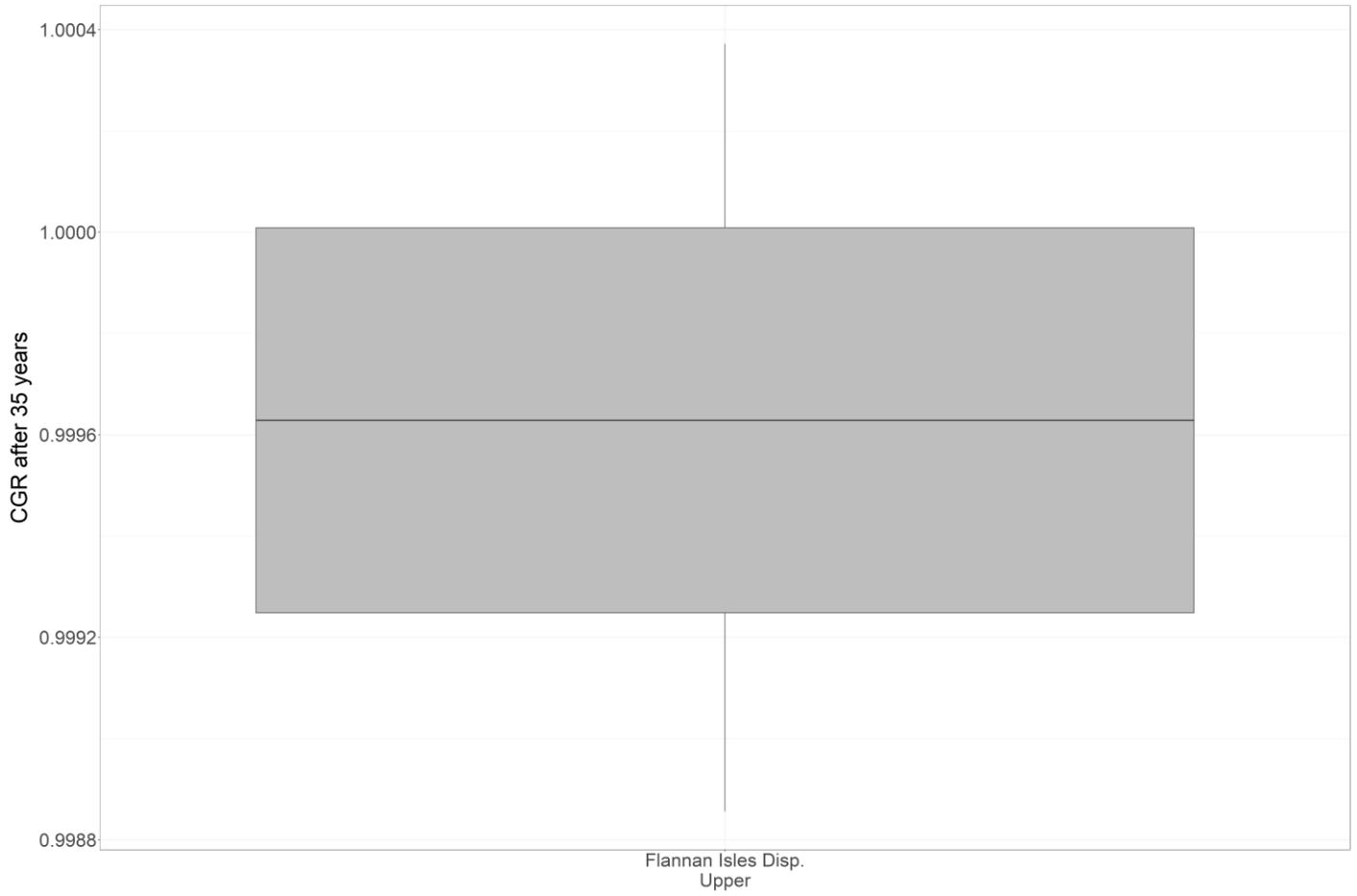
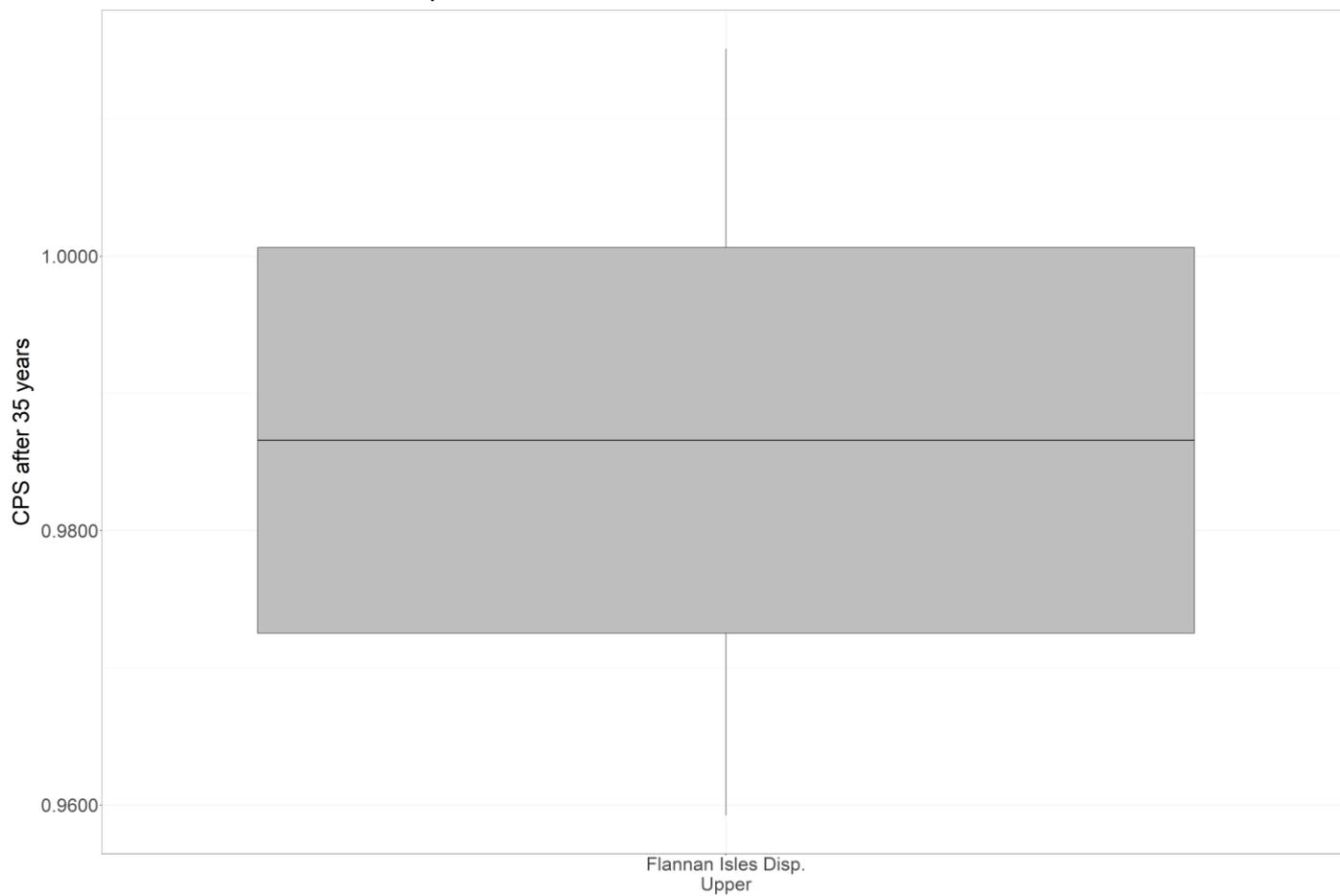


Plate 4-27 CPS after 35 Years for the Puffin Population at the Flannan Isles SPA.



4.2.4 RED-THROATED DIVER

4.2.4.1 The results of the PVA runs for impacts from the Offshore Project alone to the red-throated diver populations (as set out in **Table 3-1**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 4-4**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 4-28** to **Plate 4-30**.

Table 4-4 Offshore Project Alone PVA Outputs for Red-throated Diver After 35 Years

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 35 Years) | | | | Quantiles | |
|---------------------|--|--|---------------------------|---------------------------------------|------------|--|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Lewis Peatlands SPA | Baseline | 0 | 0.9724 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot and Applicant (100/10) | 0.26 | 0.9701 | 0.9978 | 0.9286 | 0.22 | 7.14 | 45.20 | 55.60 |

4.2.4.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Displacement NatureScot and Applicant (100/10) is presented as 'Disp.'.



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Plate 4-28 Red-throated diver Population Projection over 35-50 Years at the Lewis Peatlands SPA.

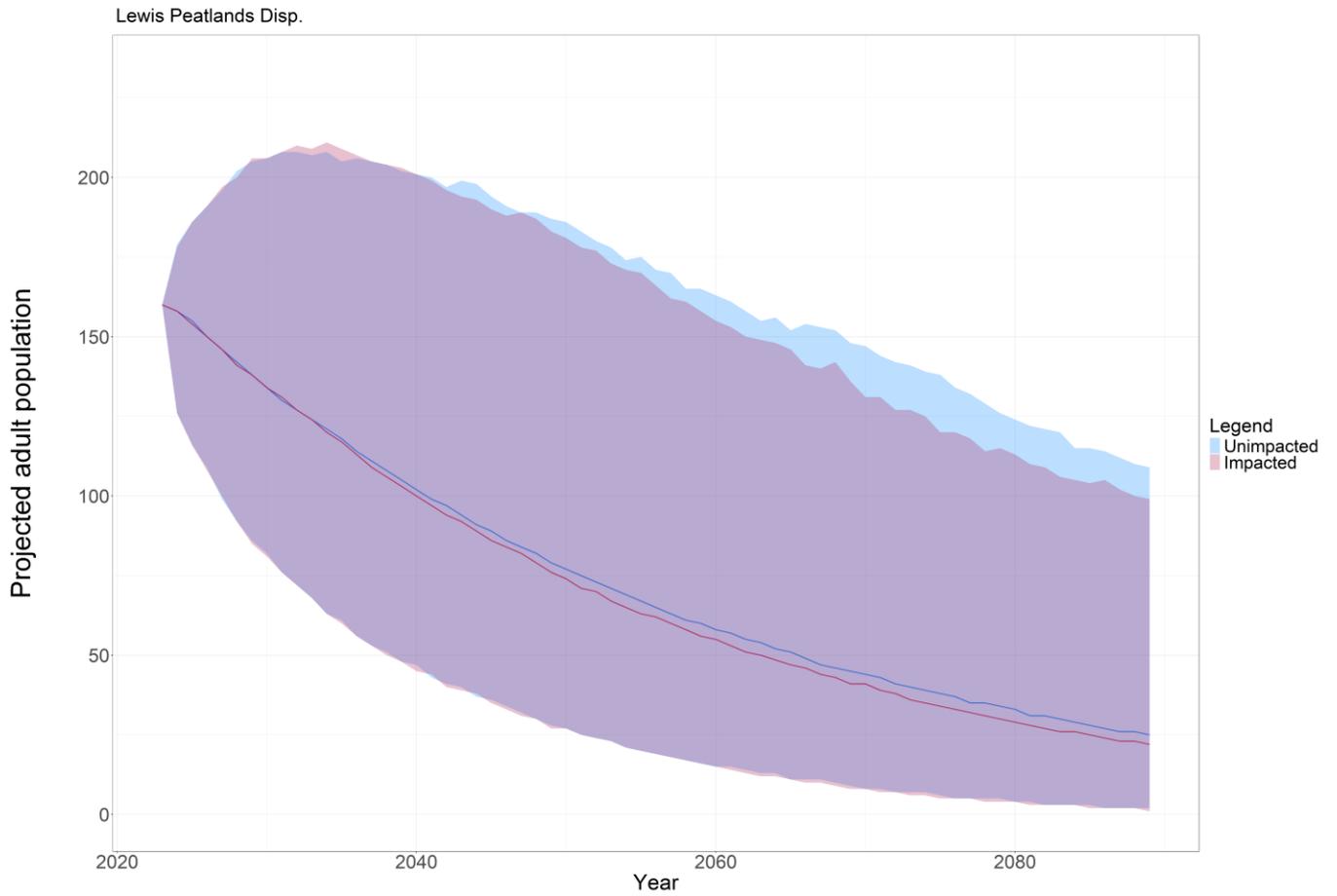


Plate 4-29 CGR after 35 Years for the Red-throated diver Population at the Lewis Peatlands SPA.

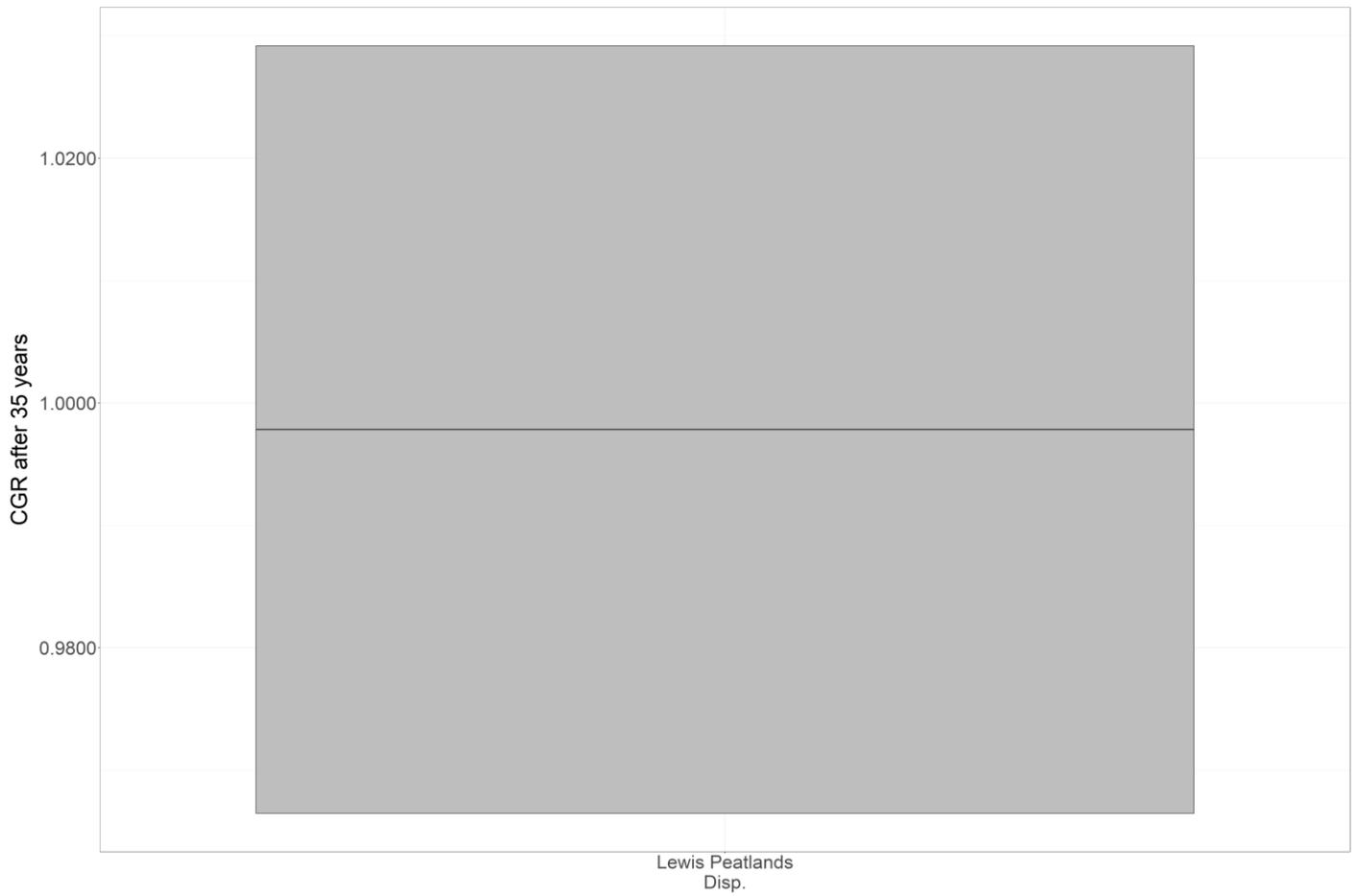
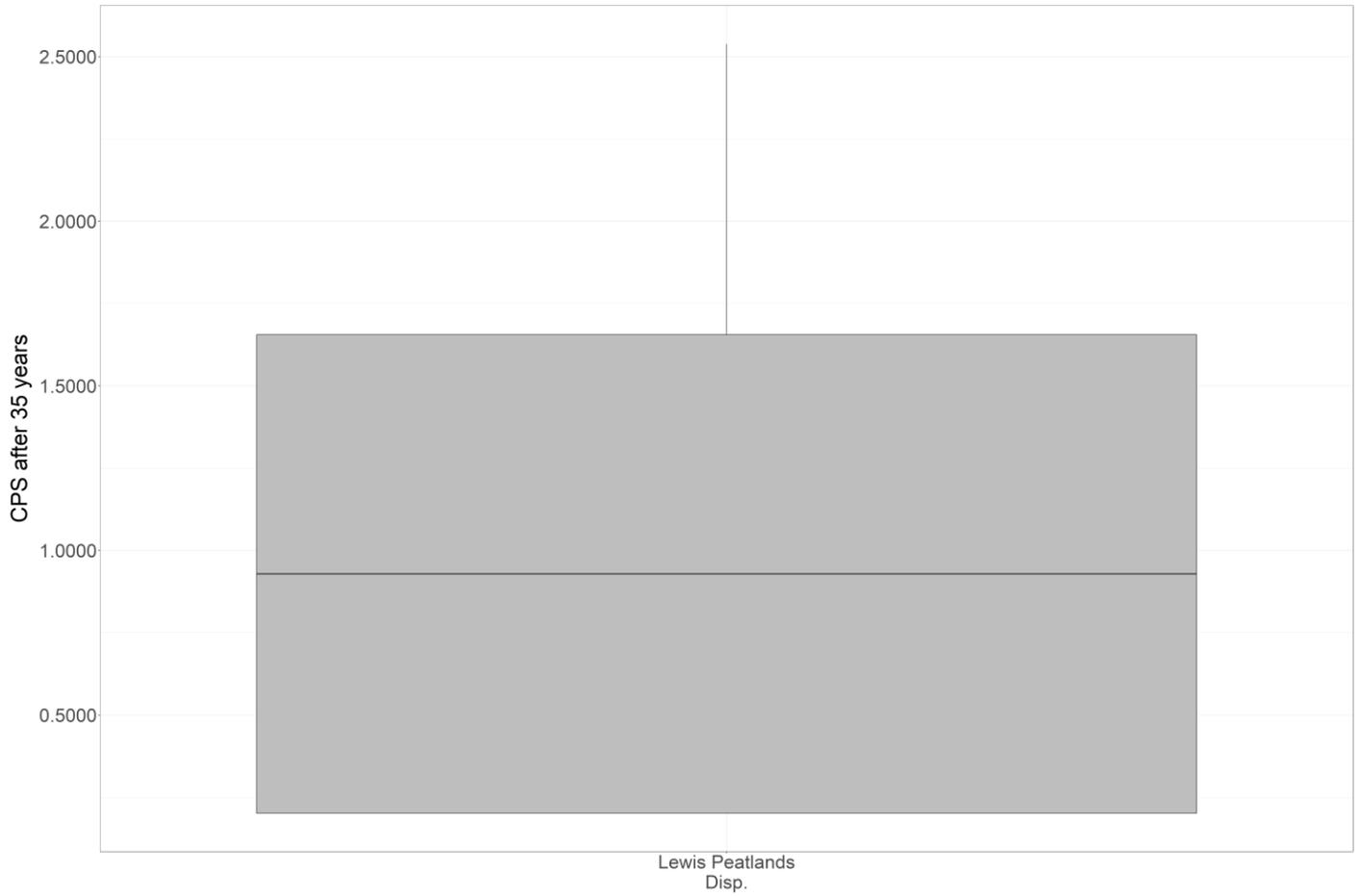


Plate 4-30 CPS after 35 Years for the Red-throated diver Population at the Lewis Peatlands SPA.



4.3 RESULTS: AFTER 50 YEARS

4.3.1 GUILLEMOT

- 4.3.1.1 The results of the PVA runs for impacts from the Offshore Project alone to the guillemot populations (as set out in **Table 3-1**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 4-5**.
- 4.3.1.2 Graphical representation of the population projections up to 50 years are presented within Section 4.2 and not repeated here.

Table 4-5 Offshore Project Alone PVA Outputs for Guillemot After 50 Years

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 50 Years) | | | | Quantiles | |
|-------------------------------|--|--|---------------------------|---------------------------------------|------------|--|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 1.0260 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 10.80 | 1.0257 | 0.9998 | 0.9879 | 0.02 | 1.21 | 47.60 | 52.36 |
| Flannan Isles SPA | Baseline | 0 | 1.0260 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 2.28 | 1.0256 | 0.9997 | 0.9823 | 0.03 | 1.77 | 46.50 | 53.28 |
| Handa SPA | Baseline | 0 | 1.0260 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 17.00 | 1.0257 | 0.9997 | 0.9870 | 0.03 | 1.30 | 47.68 | 52.82 |
| North Rona and Sula Sgeir SPA | Baseline | 0 | 1.0260 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 2.27 | 1.0257 | 0.9998 | 0.9874 | 0.02 | 1.26 | 47.52 | 52.54 |



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4.3.2 RAZORBILL

- 4.3.2.1 The results of the PVA runs for impacts from the Offshore Project alone to the razorbill populations (as set out in **Table 3-1**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 4-6**.
- 4.3.2.2 Graphical representation of the population projections up to 50 years are presented within Section 4.2 and not repeated here.

Table 4-6 Offshore Project Alone PVA Outputs for Razorbill After 50 Years

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 50 Years) | | | | Quantiles | |
|-------------------------------|--|--|---------------------------|---------------------------------------|------------|---|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate(Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Flannan Isles SPA | Baseline | 0 | 0.9762 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 0.92 | 0.9755 | 0.9993 | 0.9615 | 0.07 | 3.85 | 46.64 | 53.48 |
| | Displacement NatureScot Lower (60/3/1) | 0.53 | 0.9758 | 0.9996 | 0.9776 | 0.04 | 2.24 | 48.08 | 52.08 |
| Handa SPA | Baseline | 0 | 0.9763 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 2.94 | 0.9761 | 0.9997 | 0.9846 | 0.03 | 1.54 | 48.30 | 51.86 |
| North Rona and Sula Sgeir SPA | Baseline | 0 | 0.9760 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 0.16 | 0.9758 | 0.9996 | 0.9837 | 0.04 | 1.63 | 48.64 | 51.78 |
| | Baseline | 0 | 0.9764 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 50 Years) | | | | Quantiles | |
|------------------|--|--|---------------------------|---------------------------------------|------------|---|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate(Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Shiant Isles SPA | Displacement NatureScot Upper (60/5/3) | 2.35 | 0.9761 | 0.9997 | 0.9872 | 0.03 | 1.28 | 48.50 | 51.46 |

4.3.3 PUFFIN

- 4.3.3.1 The results of the PVA runs for impacts from the Offshore Project alone to the puffin populations (as set out in **Table 3-1**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 4-7**.
- 4.3.3.2 Graphical representation of the population projections up to 50 years are presented within Section 4.2 and not repeated here.

Table 4-7 Offshore Project Alone PVA Outputs for Puffin After 50 Years

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 50 Years) | | | | Quantiles | |
|-------------------|--|--|---------------------------|---------------------------------------|------------|--|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Flannan Isles SPA | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 31.99 | 0.9716 | 0.9996 | 0.9813 | 0.04 | 1.87 | 48.48 | 51.30 |



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4.3.4 RED-THROATED DIVER

- 4.3.4.1 The results of the PVA runs for impacts from the Offshore Project alone to the red-throated diver populations (as set out in **Table 3-1**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 4-8**.
- 4.3.4.2 Graphical representation of the population projections up to 50 years are presented within Section 4.2 and not repeated here.

Table 4-8 Offshore Project Alone PVA Outputs for Red-throated Diver After 50 Years

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Median Annual Growth Rate | Density-Independence (After 50 Years) | | | | Quantiles | |
|---------------------|--|--|---------------------------|---------------------------------------|------------|--|--|-----------|---------|
| | | | | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Lewis Peatlands SPA | Baseline | 0 | 0.9719 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot and Applicant (100/10) | 0.26 | 0.9696 | 0.9974 | 0.8788 | 0.26 | 12.12 | 45.72 | 57.40 |



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5 OFFSHORE PROJECT IN-COMBINATION ASSESSMENT OUTPUTS

5.1 OFFSHORE PROJECT IN-COMBINATION ASSESSMENT OUTPUTS OVERVIEW

- 5.1.1.1 The results of the Offshore Project in-combination PVAs for impacts are presented for each species, SPA and scenario listed in **Table 3-2**. These results are set out within Section 5.2, and reflect impacts from the first full year of operation (2034) following the construction phase (finishing in 2033) and cover the expected 35-year operational lifespan of the Offshore Project. The 35-year PVAs form the basis for the assessment conclusions. In accordance with NatureScot guidance (NatureScot, 2023b), results for 50-year time periods are also provided within Section 5.3, although they are not used to inform the conclusions of the assessment.
- 5.1.1.2 The baseline 'unimpacted' scenarios (i.e. assuming no additional mortality other than baseline mortality exists) are also shown for comparison purposes. Graphs relating to population size, CPS, and CGR for each impact scenario for the lifetime of the Offshore Project are also presented for the 35-year period in line with guidance (NatureScot, 2023b).
- 5.1.1.3 All plates which depict the population projection have been modelled from 2024 (before the impact starts) to 2083 (50 years following the cessation of the construction phase), these plates are only presented in Section 5.2 (35 year results) and are not repeated in Section 5.3 (50 year results).
- 5.1.1.4 Within the population project plates, the unimpacted population is shown in blue, with the impacted population overlaid in red. The blue shading represents the 95% confidence interval for the unimpacted population, while the red shading represents the 95% confidence interval for the impacted population. Where the red and blue overlap, the combined colour (purple) indicates a similar population projection.
- 5.1.1.5 Within the GCR and CPS plates the central line represents the median, the shaded box represents 1 standard deviation above and below the median.

5.2 RESULTS: AFTER 35 YEARS

5.2.1 KITTIWAKE

- 5.2.1.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the kittiwake populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 5-1**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 5-1** to **Plate 5-21**.

Table 5-1 Offshore Project In-combination PVA Outputs for Kittiwake After 35 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|----------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 1.0026 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 11.63 | 1.0006 | 0.9981 | 0.9341 | 0.19 | 6.59 | 43.40 | 56.04 |
| | Collision only (without Berwick Bank) | 11.55 | 1.0006 | 0.9981 | 0.9337 | 0.19 | 6.63 | 43.66 | 56.02 |
| | Displacement NatureScot Upper (30/3) (with Berwick Bank) | 5.01 | 1.0017 | 0.9992 | 0.9707 | 0.08 | 2.93 | 47.12 | 52.76 |
| | Displacement NatureScot Upper (30/3) (without Berwick Bank) | 4.95 | 1.0017 | 0.9992 | 0.9717 | 0.08 | 2.83 | 47.08 | 52.78 |
| | Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 1.67 | 1.0023 | 0.9997 | 0.9898 | 0.03 | 1.02 | 48.92 | 51.26 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 1.65 | 1.0022 | 0.9997 | 0.9897 | 0.03 | 1.03 | 49.22 | 50.98 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 16.64 | 0.9999 | 0.9973 | 0.9071 | 0.27 | 9.29 | 40.58 | 59.18 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 15.38 | 1.0001 | 0.9975 | 0.9132 | 0.25 | 8.68 | 41.22 | 58.42 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 16.50 | 0.9999 | 0.9973 | 0.9068 | 0.27 | 9.32 | 40.68 | 58.84 |
| | Combined Collisions and Displacement NatureScot | 13.30 | 1.0003 | 0.9978 | 0.9252 | 0.22 | 7.48 | 42.52 | 57.34 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|---------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Lower and Applicant (30/1) (without Berwick Bank) | | | | | | | | |
| East Caithness Cliffs SPA | Baseline | 0 | 1.0025 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 205.75 | 0.9976 | 0.9950 | 0.8360 | 0.50 | 16.40 | 33.00 | 65.92 |
| | Displacement NatureScot Upper (30/3) | 139.27 | 0.9992 | 0.9966 | 0.8855 | 0.34 | 11.45 | 38.16 | 61.04 |
| | Displacement NatureScot Lower and Applicant (30/1) | 46.41 | 1.0014 | 0.9989 | 0.9605 | 0.11 | 3.95 | 45.92 | 53.82 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) | 345.01 | 0.9942 | 0.9917 | 0.7397 | 0.83 | 26.03 | 24.34 | 76.40 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) | 252.16 | 0.9964 | 0.9939 | 0.8023 | 0.61 | 19.77 | 29.74 | 69.28 |
| | Baseline | 0 | 1.0025 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 435.64 | 0.9969 | 0.9943 | 0.8154 | 0.57 | 18.46 | 31.06 | 67.50 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|---------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Flamborough and Filey Coast SPA | Displacement NatureScot Upper (30/3) | 285.95 | 0.9988 | 0.9963 | 0.8745 | 0.37 | 12.55 | 37.02 | 61.76 |
| | Displacement NatureScot Lower and Applicant (30/1) | 95.27 | 1.0013 | 0.9988 | 0.9565 | 0.12 | 4.35 | 45.64 | 53.86 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) | 721.59 | 0.9931 | 0.9906 | 0.7123 | 0.94 | 28.77 | 21.26 | 79.18 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) | 530.91 | 0.9956 | 0.9931 | 0.7795 | 0.69 | 22.05 | 27.78 | 71.46 |
| North Caithness Cliffs SPA | Baseline | 0 | 1.0025 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 39.00 | 1.0008 | 0.9982 | 0.9381 | 0.18 | 6.19 | 43.84 | 55.50 |
| | Displacement NatureScot Upper (30/3) | 28.69 | 1.0012 | 0.9987 | 0.9540 | 0.13 | 4.60 | 45.24 | 54.12 |
| | Displacement NatureScot Lower and Applicant (30/1) | 9.56 | 1.0021 | 0.9996 | 0.9843 | 0.04 | 1.57 | 48.72 | 51.14 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|---------------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Upper (30/3) | 67.69 | 0.9995 | 0.9969 | 0.8953 | 0.31 | 10.47 | 39.26 | 59.76 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) | 48.56 | 1.0003 | 0.9978 | 0.9235 | 0.22 | 7.65 | 42.18 | 56.82 |
| North Colonsay and Western Cliffs SPA | Baseline | 0 | 1.0025 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 5.97 | 1.0014 | 0.9989 | 0.9615 | 0.11 | 3.85 | 46.16 | 53.84 |
| | Collision only (without Berwick Bank) | 5.16 | 1.0017 | 0.9991 | 0.9667 | 0.09 | 3.33 | 46.76 | 52.94 |
| | Displacement NatureScot Upper (30/3) (with Berwick Bank) | 2.41 | 1.0021 | 0.9995 | 0.9841 | 0.05 | 1.59 | 48.28 | 51.54 |
| | Displacement NatureScot Upper (30/3) (without Berwick Bank) | 2.01 | 1.0022 | 0.9996 | 0.9871 | 0.04 | 1.29 | 48.88 | 51.06 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 8.38 | 1.0010 | 0.9985 | 0.9473 | 0.15 | 5.27 | 44.56 | 54.98 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 7.17 | 1.0013 | 0.9987 | 0.9555 | 0.13 | 4.45 | 45.66 | 53.86 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 6.77 | 1.0014 | 0.9988 | 0.9577 | 0.12 | 4.23 | 45.72 | 54.04 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 5.83 | 1.0015 | 0.9990 | 0.9632 | 0.10 | 3.68 | 46.30 | 53.50 |
| | Baseline | 0 | 1.0025 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|--------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Rathlin Island SPA | Collision only (with Berwick Bank) | 8.86 | 1.0021 | 0.9996 | 0.9867 | 0.04 | 1.33 | 48.94 | 51.08 |
| | Collision only (without Berwick Bank) | 8.80 | 1.0021 | 0.9996 | 0.9868 | 0.04 | 1.32 | 48.58 | 51.04 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 12.40 | 1.0020 | 0.9995 | 0.9806 | 0.05 | 1.94 | 48.32 | 52.02 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 12.29 | 1.0020 | 0.9995 | 0.9814 | 0.05 | 1.86 | 48.44 | 51.52 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 10.04 | 1.0021 | 0.9996 | 0.9840 | 0.04 | 1.60 | 48.64 | 51.26 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 9.97 | 1.0021 | 0.9996 | 0.9851 | 0.04 | 1.49 | 48.54 | 51.30 |
| West Westray SPA | Baseline | 0 | 1.0025 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 42.69 | 0.9934 | 0.9908 | 0.7169 | 0.92 | 28.31 | 21.70 | 78.96 |
| | Collision only (without Berwick Bank) | 37.28 | 0.9946 | 0.9920 | 0.7480 | 0.80 | 25.20 | 24.82 | 75.20 |
| | Displacement NatureScot Upper (30/3) (with Berwick Bank) | 32.72 | 0.9954 | 0.9930 | 0.7746 | 0.70 | 22.54 | 27.30 | 72.08 |
| | Displacement NatureScot Upper (30/3) (without Berwick Bank) | 28.11 | 0.9965 | 0.9940 | 0.8035 | 0.60 | 19.65 | 30.18 | 69.12 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Lower (30/1) and Applicant (with Berwick Bank) | 10.91 | 1.0002 | 0.9977 | 0.9191 | 0.23 | 8.09 | 41.88 | 57.54 |
| | Displacement NatureScot Lower (30/1) and Applicant (without Berwick Bank) | 9.37 | 1.0004 | 0.9980 | 0.9298 | 0.20 | 7.02 | 42.76 | 56.58 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 75.41 | 0.9863 | 0.9838 | 0.5541 | 1.62 | 44.59 | 8.68 | 92.42 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 65.40 | 0.9885 | 0.9859 | 0.6003 | 1.41 | 39.97 | 11.60 | 89.36 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 53.60 | 0.9909 | 0.9885 | 0.6581 | 1.15 | 34.19 | 16.46 | 84.28 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 46.66 | 0.9925 | 0.9900 | 0.6957 | 1.00 | 30.43 | 19.84 | 80.96 |

5.2.1.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Collisions only is presented as 'Col.';
- Displacement NatureScot Upper (30/3) is presented as 'Disp. Upper';
- Displacement NatureScot Lower and Applicant (30/1) is presented as 'Disp. Lower';
- Combined Collisions and Displacement NatureScot Upper (30/3) is presented as 'Comb. Upper';
- Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) is presented as 'Comb. Lower'
- The scenarios with Berwick Bank are presented as '(Inc. BB)';
- The scenarios without Berwick Bank are presented as '(Exc. BB).

Plate 5-1 Kittiwake Population Projection over 35-50 Years at the Cape Wrath SPA

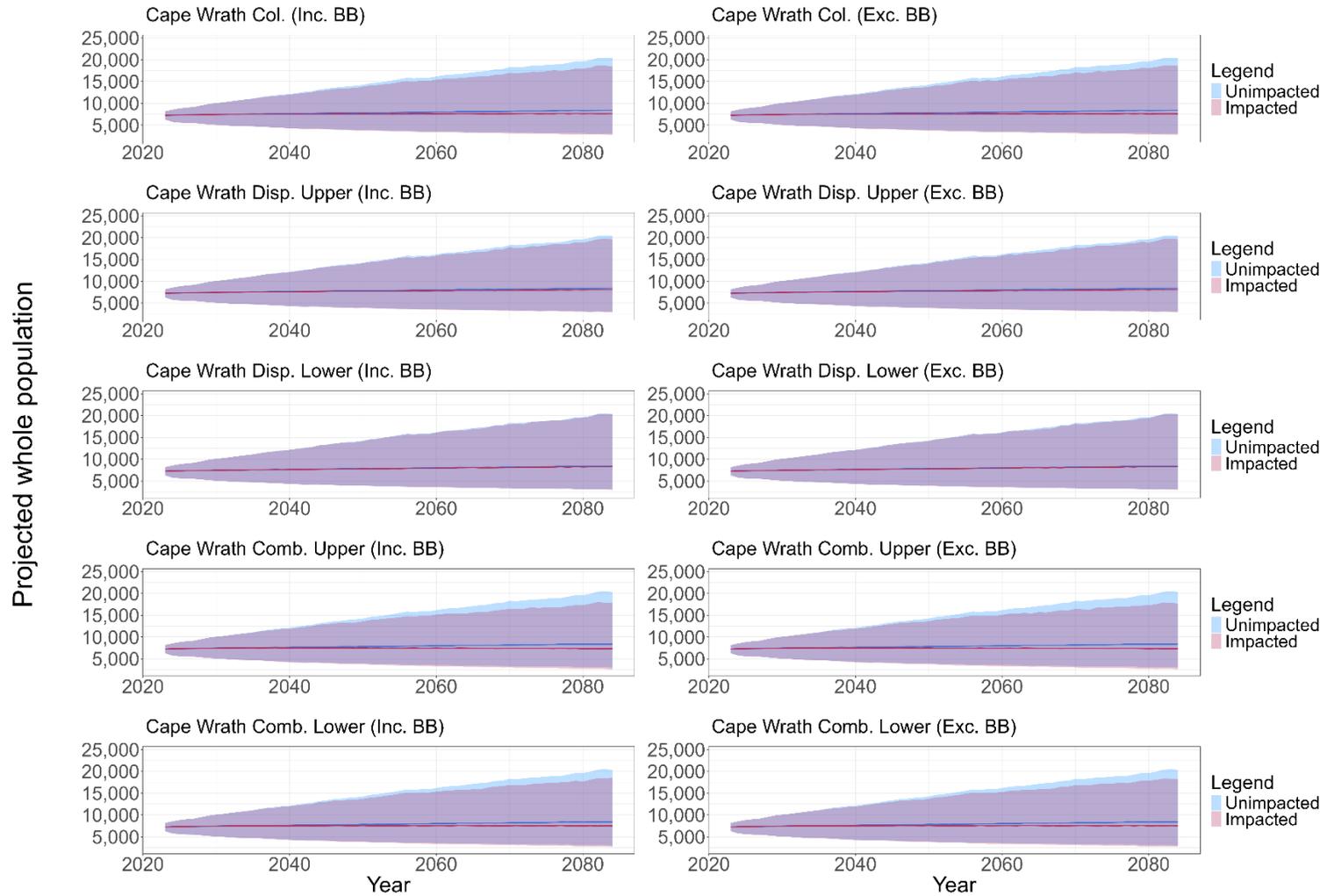


Plate 5-2 CGR after 35 Years for the Kittiwake Population at the Cape Wrath SPA.

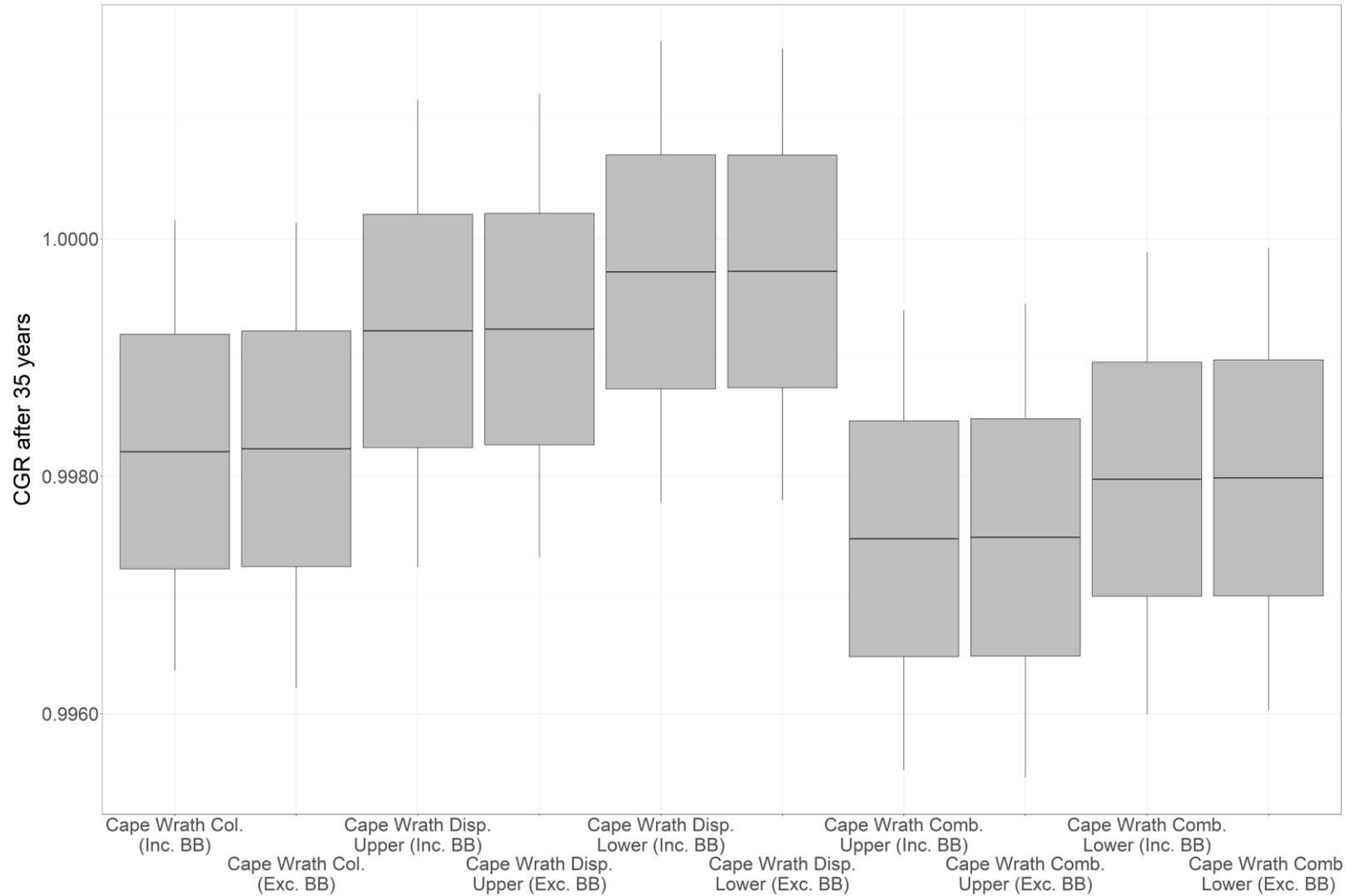


Plate 5-3 CPS after 35 Years for the Kittiwake Population at the Cape Wrath SPA.

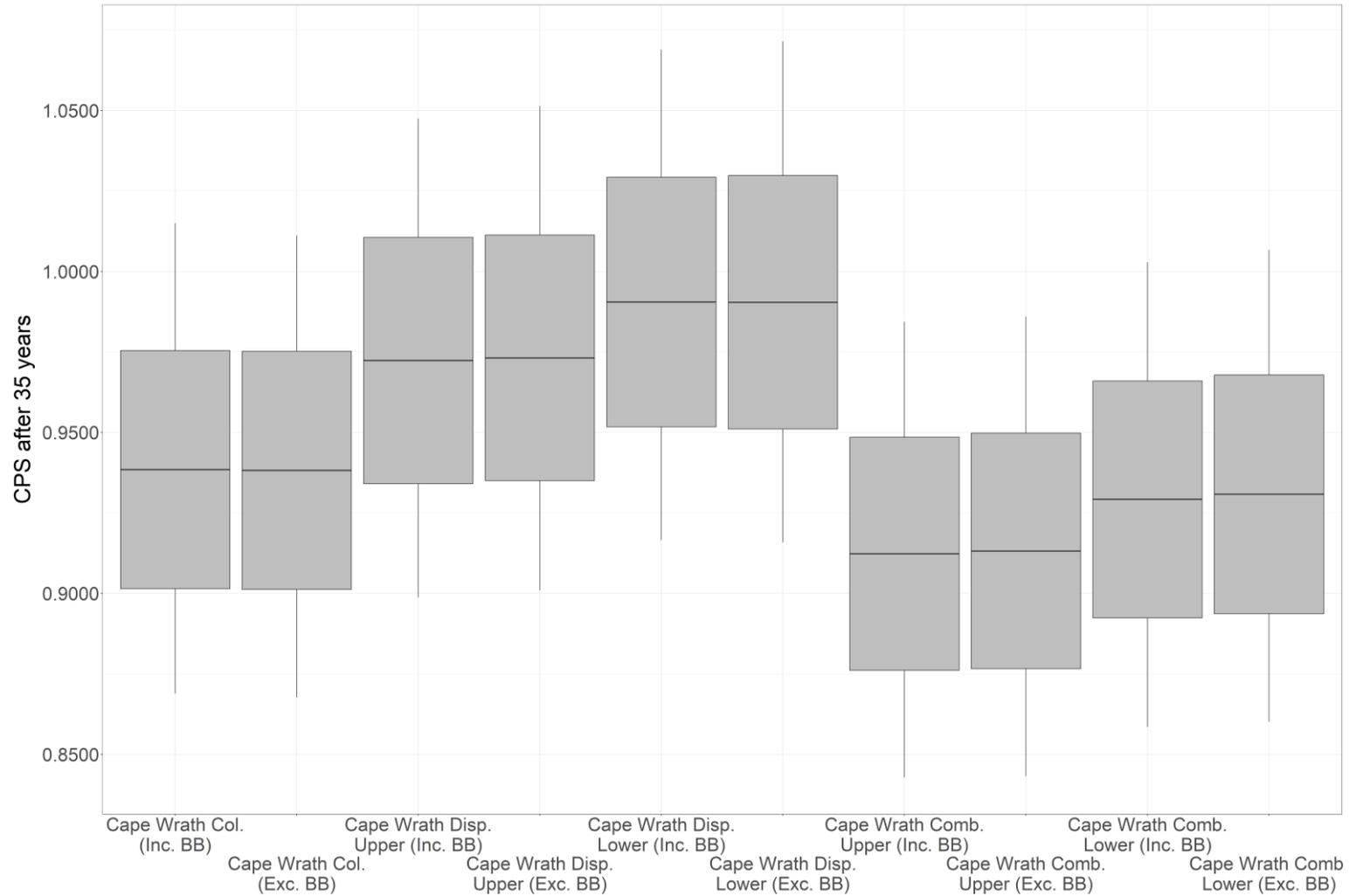


Plate 5-4 Kittiwake Population Projection over 35-50 Years at the East Caithness Cliffs SPA.

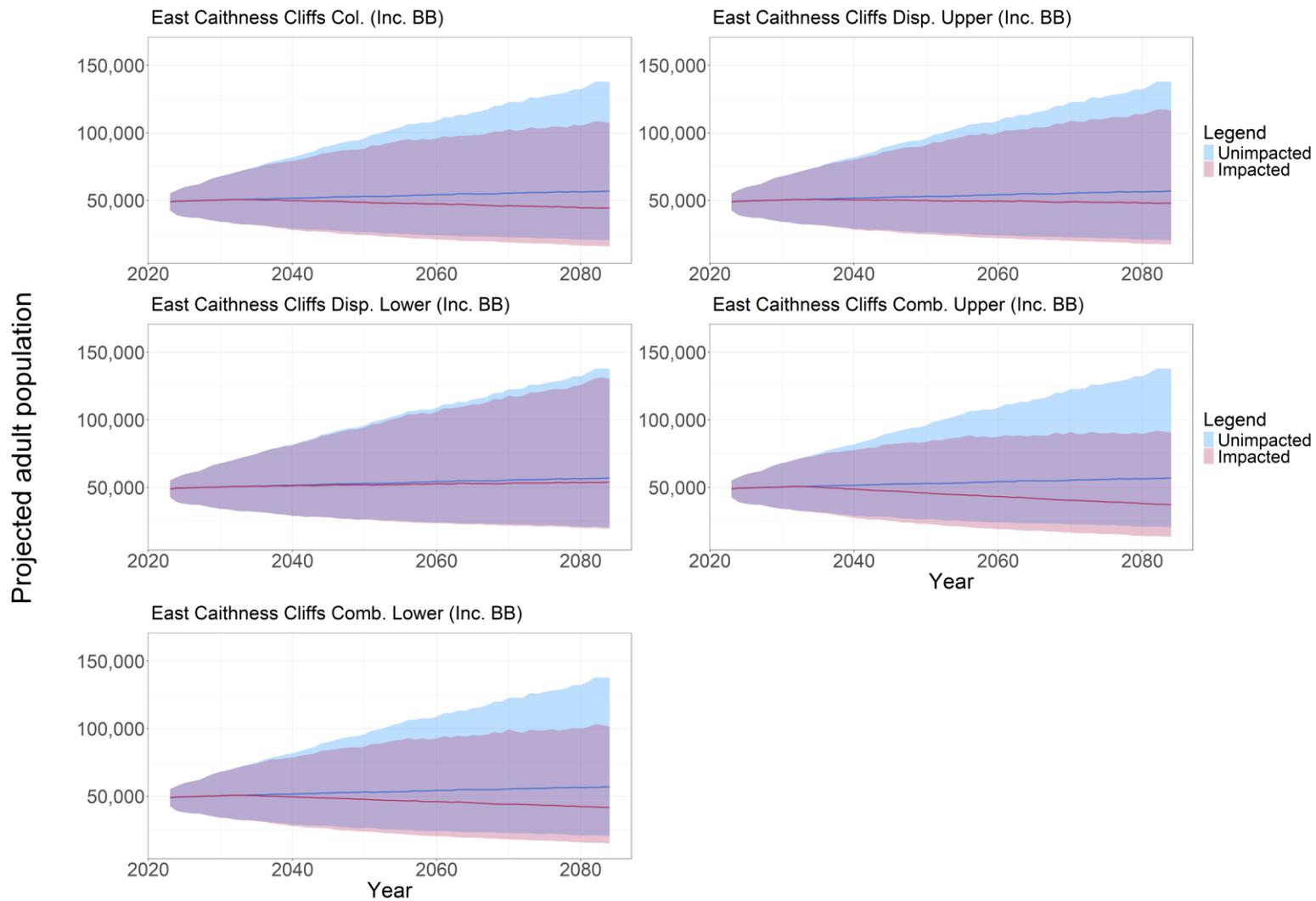


Plate 5-5 CGR after 35 Years for the Kittiwake Population at the East Caithness Cliffs SPA.

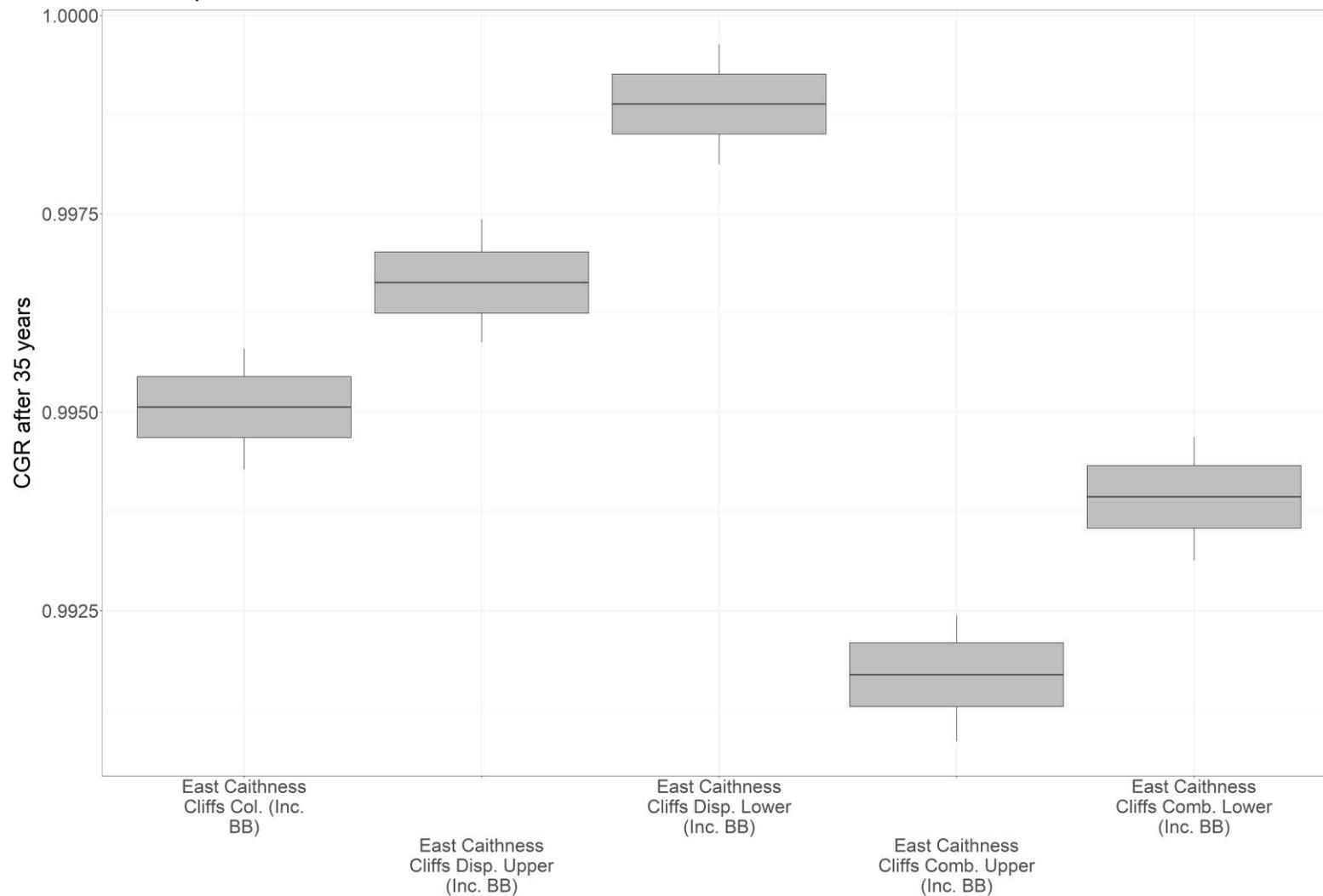


Plate 5-6 CPS after 35 Years for the Kittiwake Population at the East Caithness Cliffs SPA.

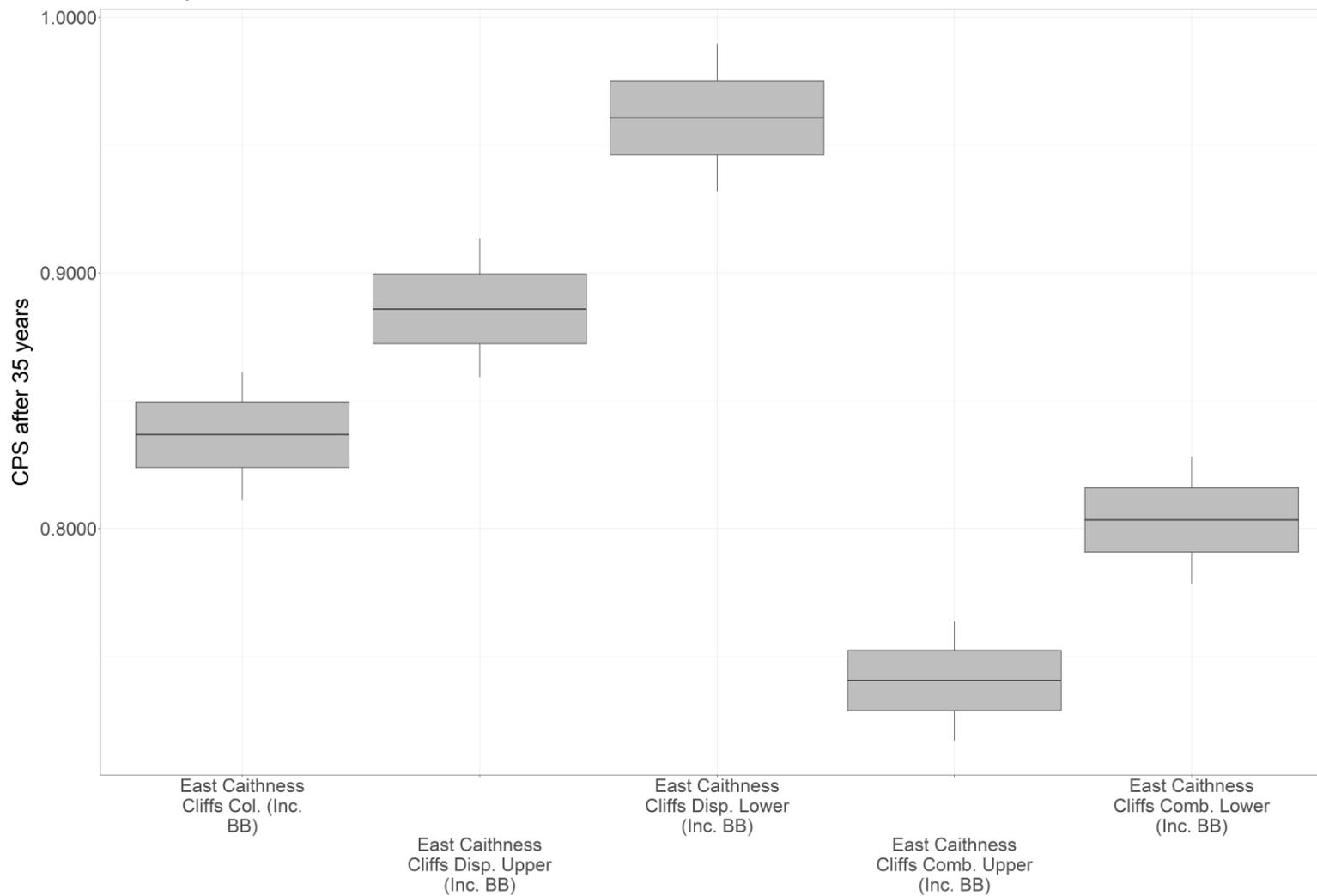


Plate 5-7 Kittiwake Population Projection over 35-50 Years at the Flamborough and Filey Coast SPA.

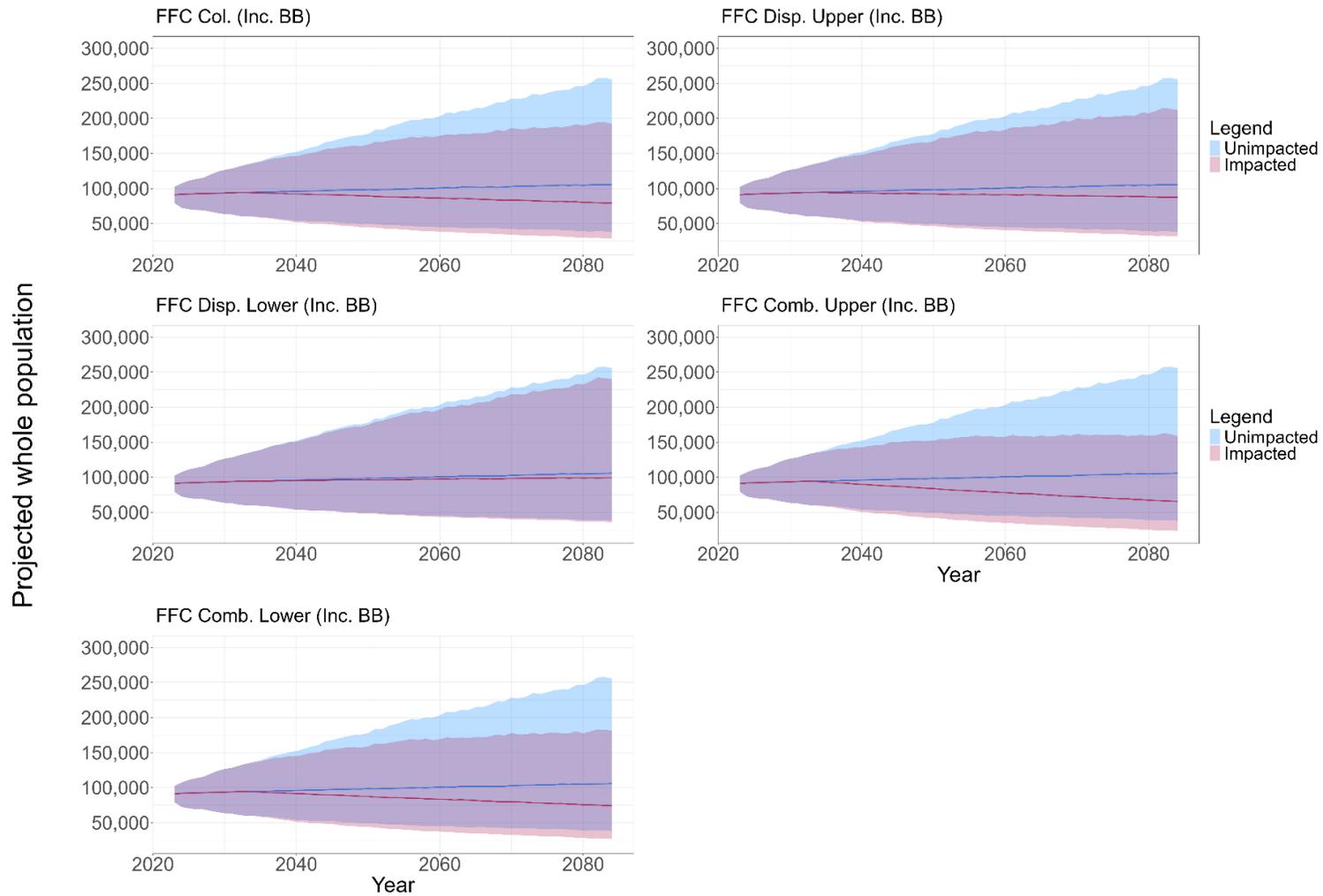


Plate 5-8 CGR after 35 Years for the Kittiwake Population at the Flamborough and Filey Coast SPA.

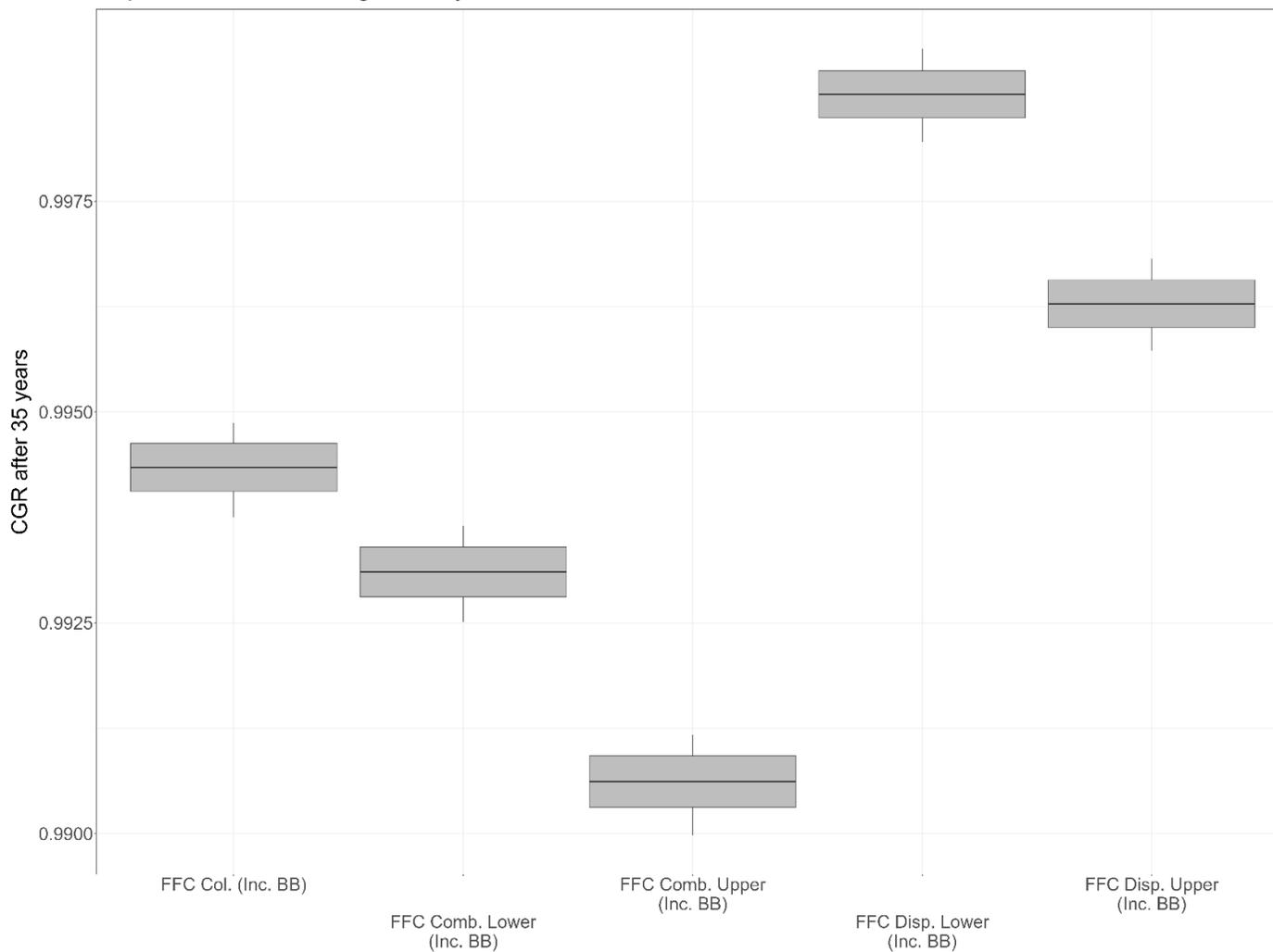


Plate 5-9 CPS after 35 Years for the Kittiwake Population at the Flamborough and Filey Coast SPA.

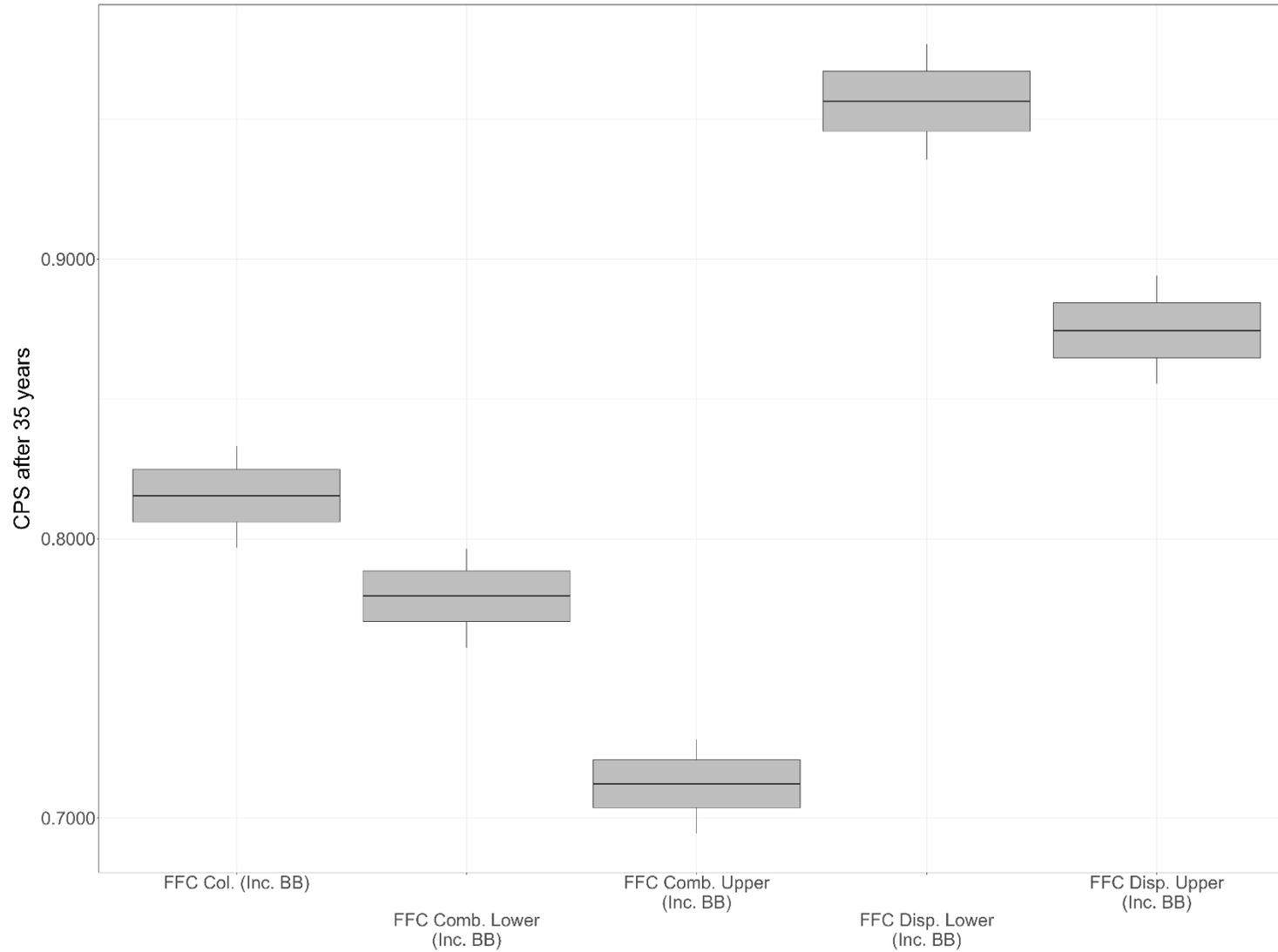


Plate 5-10 Kittiwake Population Projection over 35-50 Years at the North Caithness Cliffs SPA.

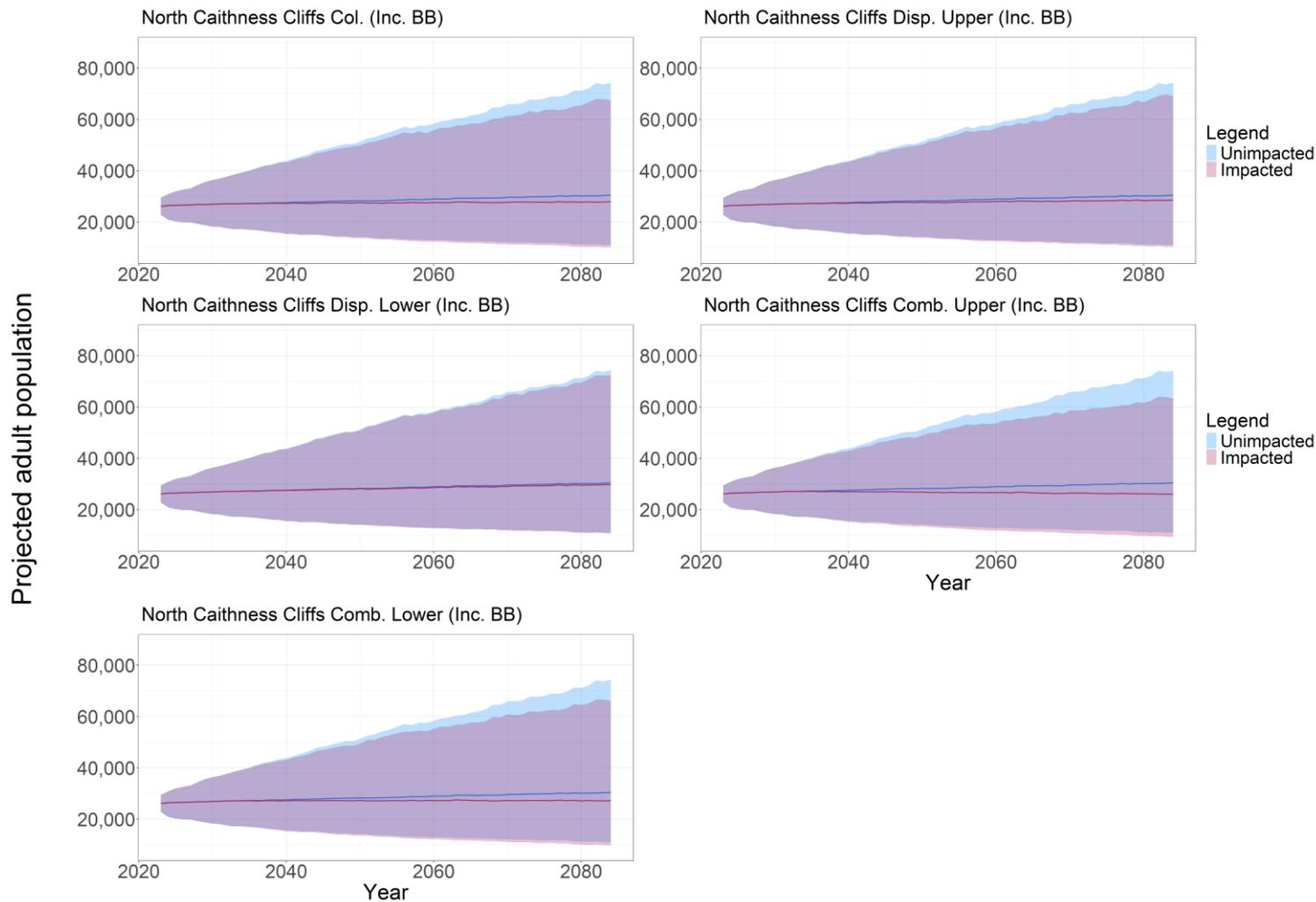


Plate 5-11 CGR after 35 Years for the Kittiwake Population at the North Caithness Cliffs SPA.

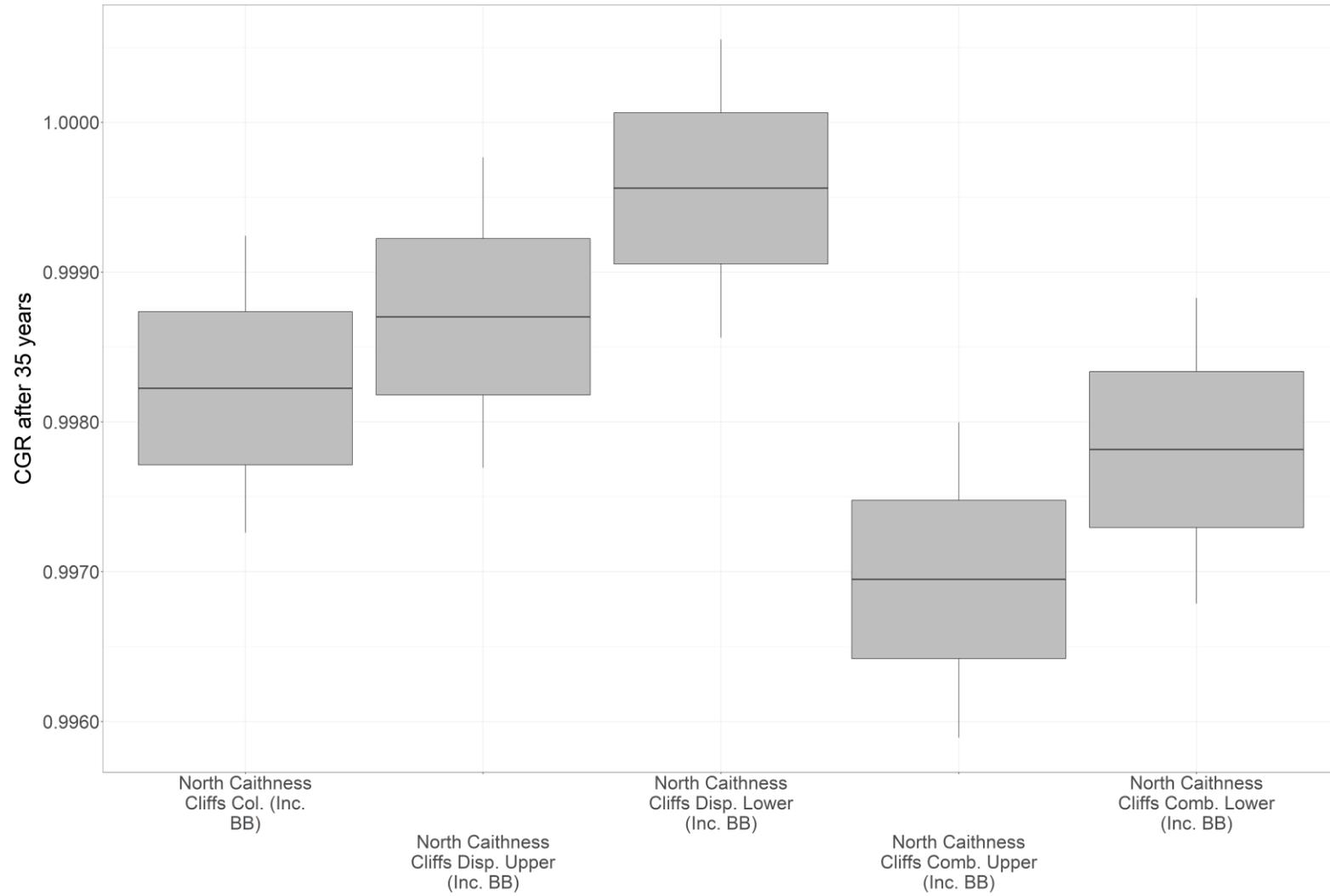


Plate 5-12 CPS after 35 Years for the Kittiwake Population at the North Caithness Cliffs SPA.

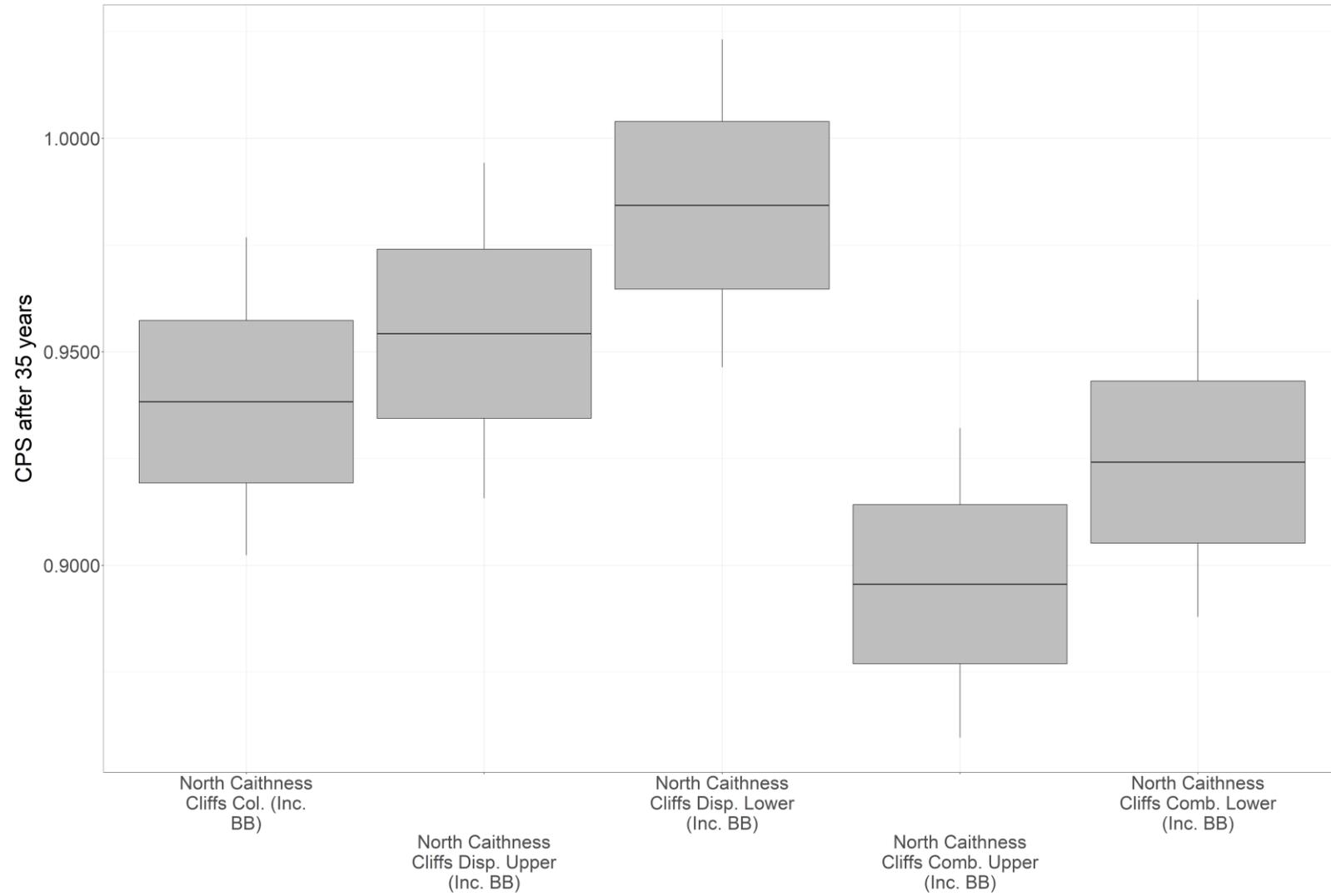


Plate 5-13 Kittiwake Population Projection over 35-50 Years at the North Colonsay and Western Cliffs SPA.

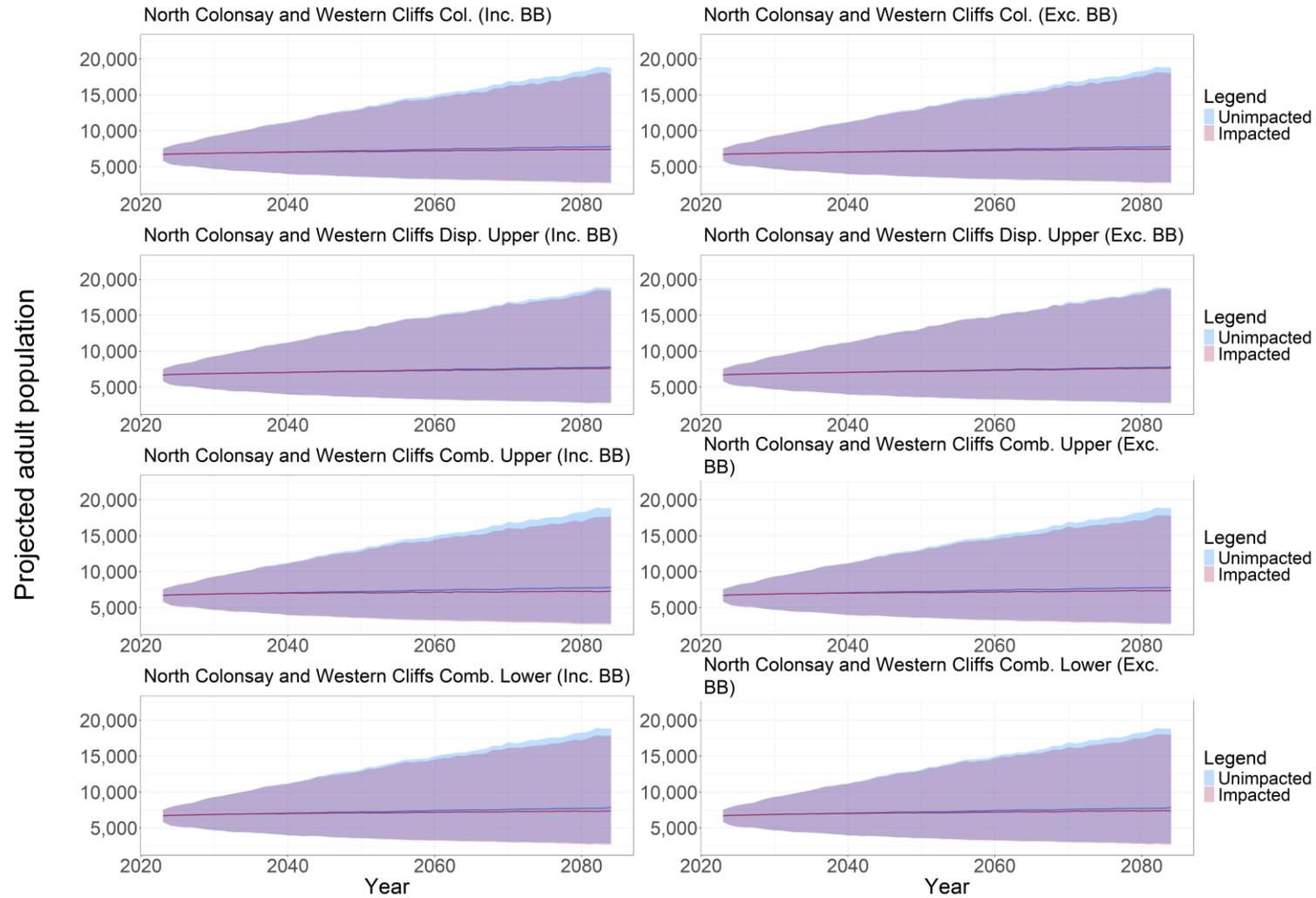


Plate 5-14 CGR after 35 Years for the Kittiwake Population at the North Colonsay and Western Cliffs SPA.

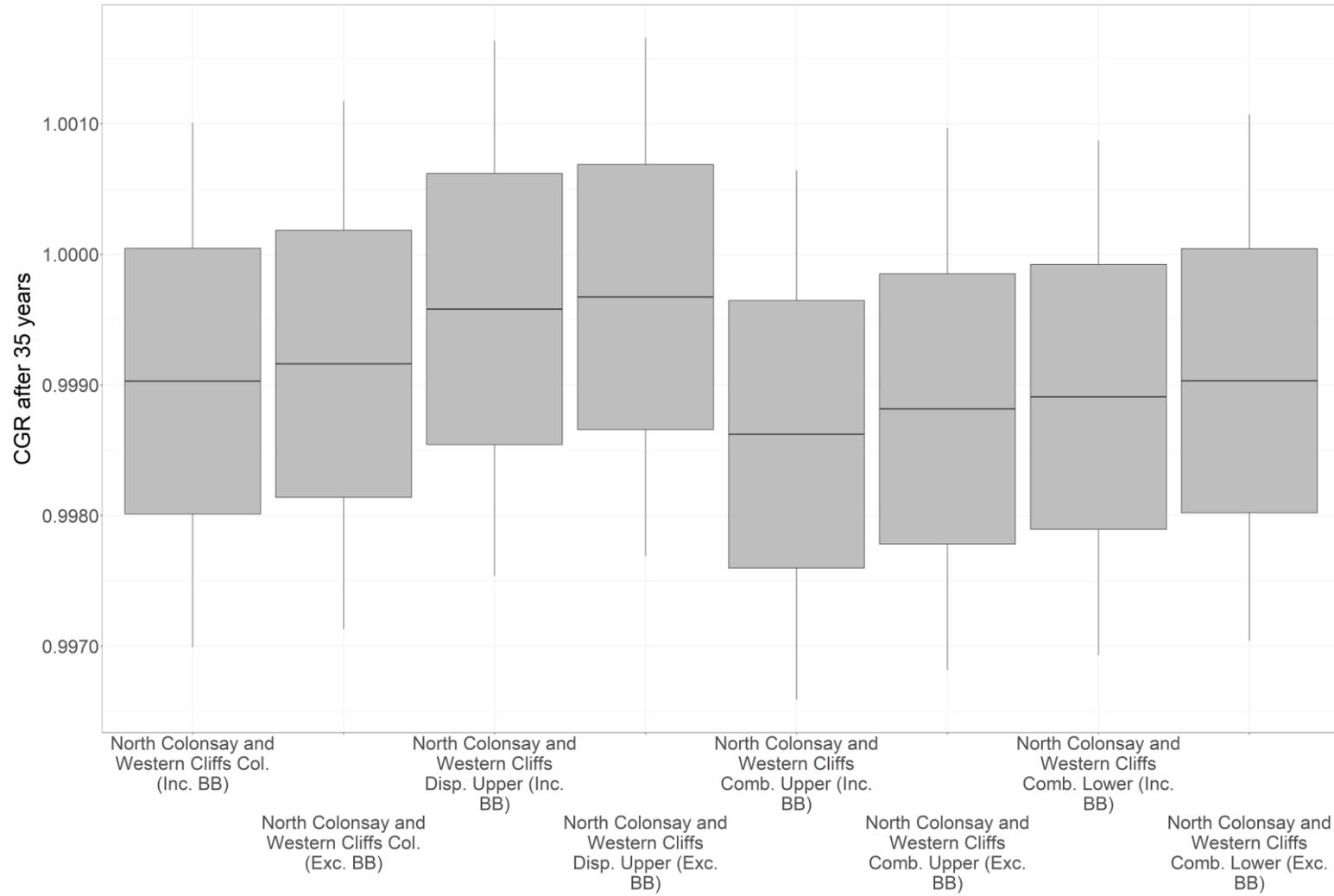


Plate 5-15 CPS after 35 Years for the Kittiwake Population at the North Colonsay and Western Cliffs SPA.

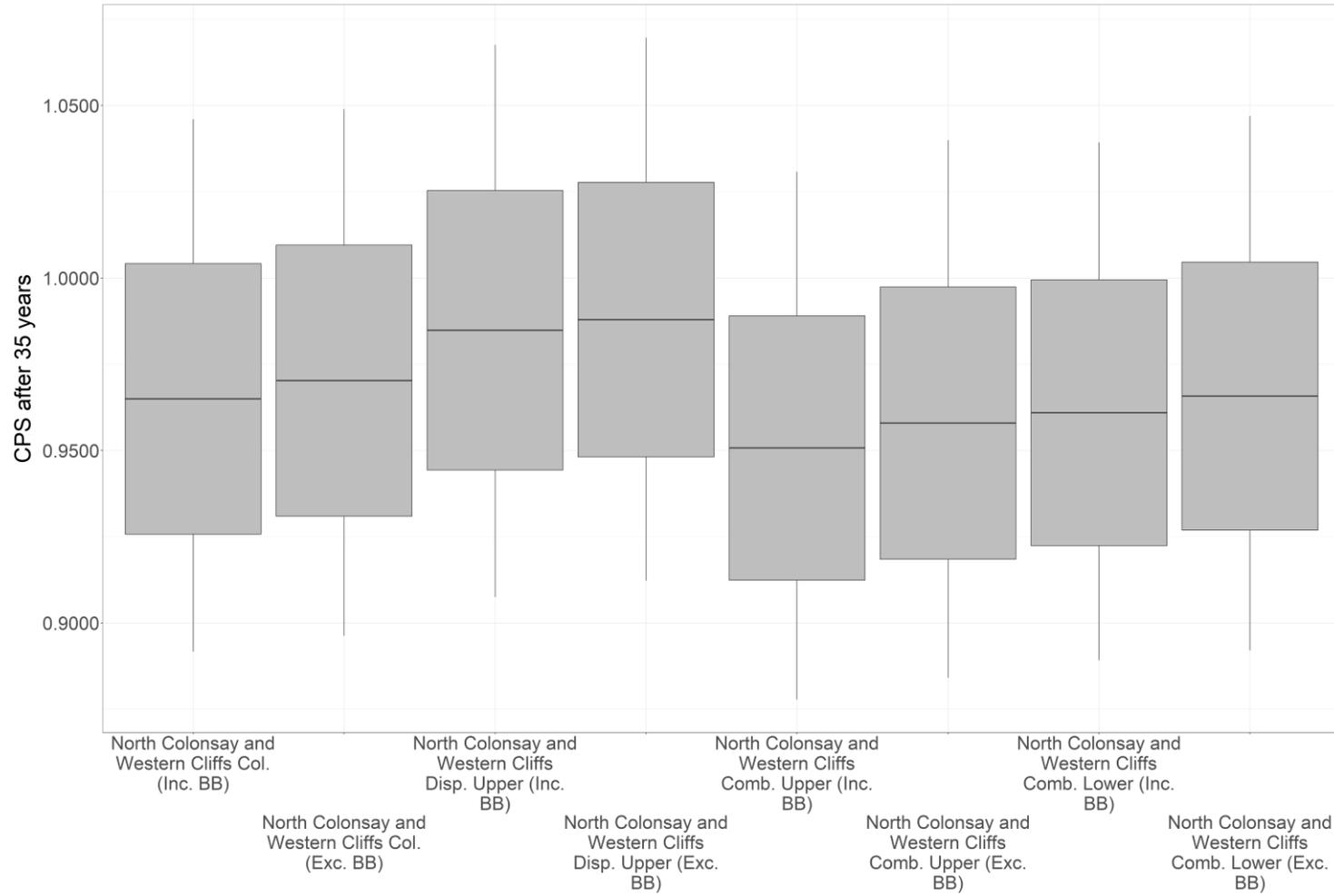


Plate 5-16 Kittiwake Population Projection over 35-50 Years at the Rathlin Island SPA.

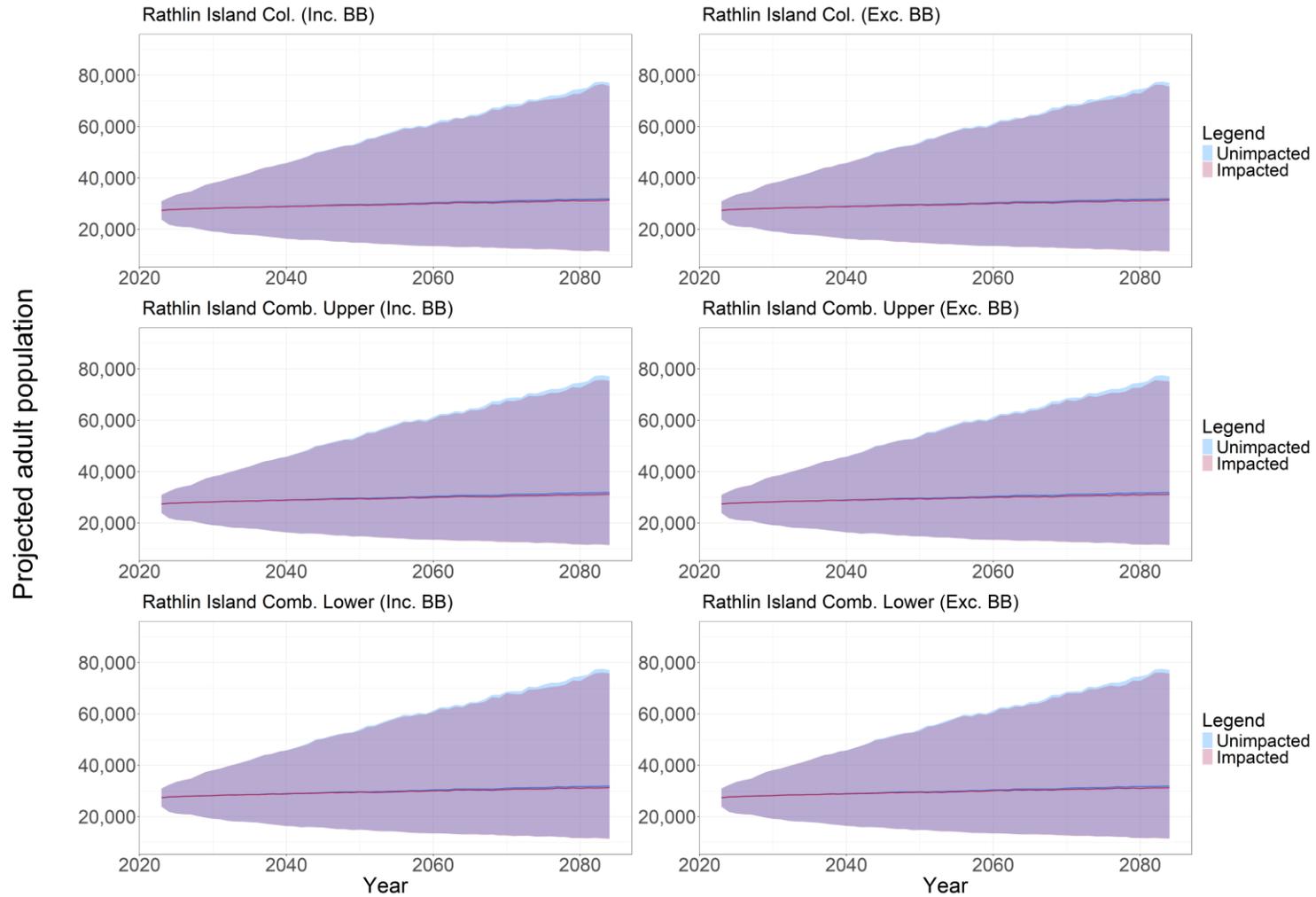


Plate 5-17 CGR after 35 Years for the Kittiwake Population at the Rathlin Island SPA.

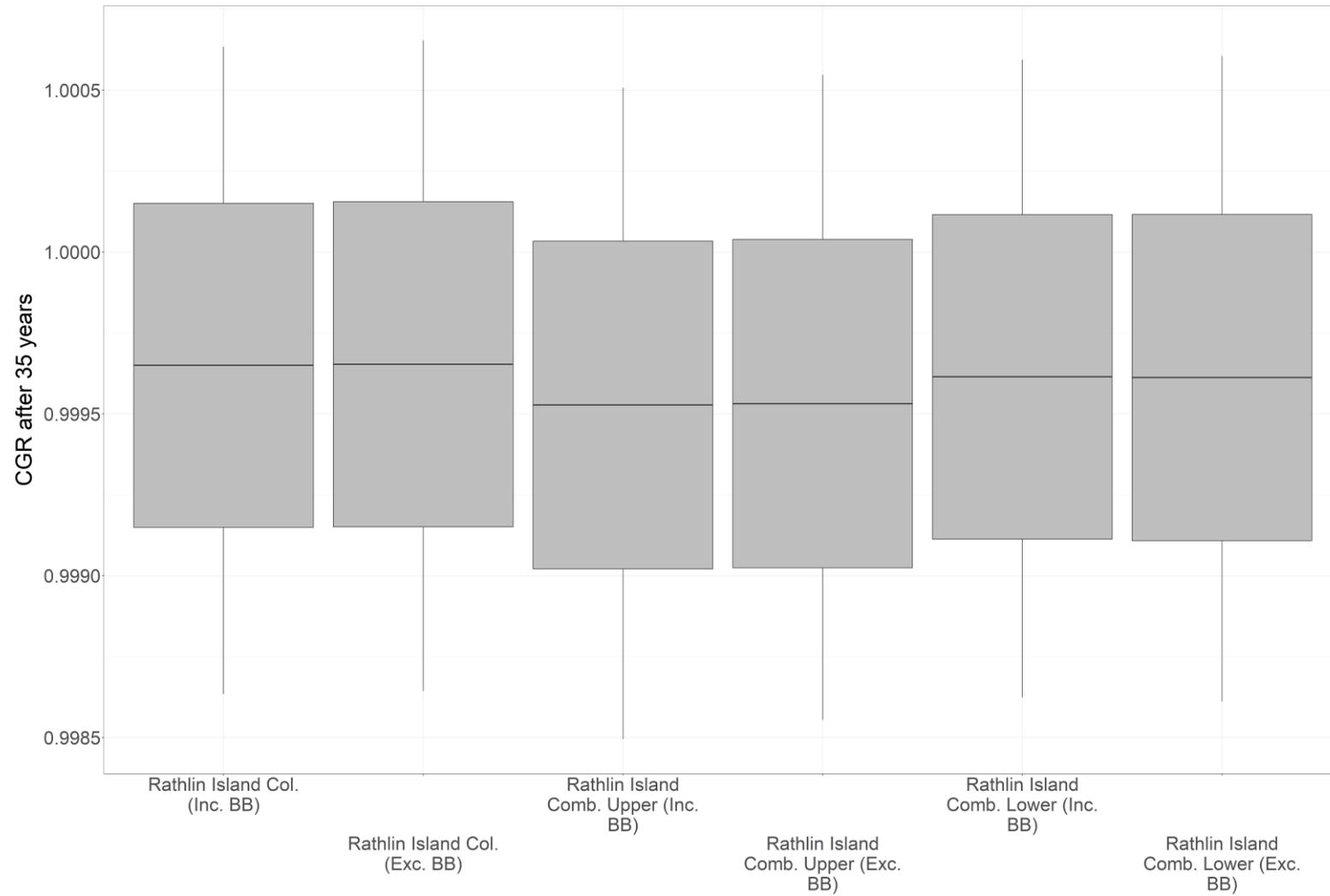


Plate 5-18 CPS after 35 Years for the Kittiwake Population at the Rathlin Island SPA.

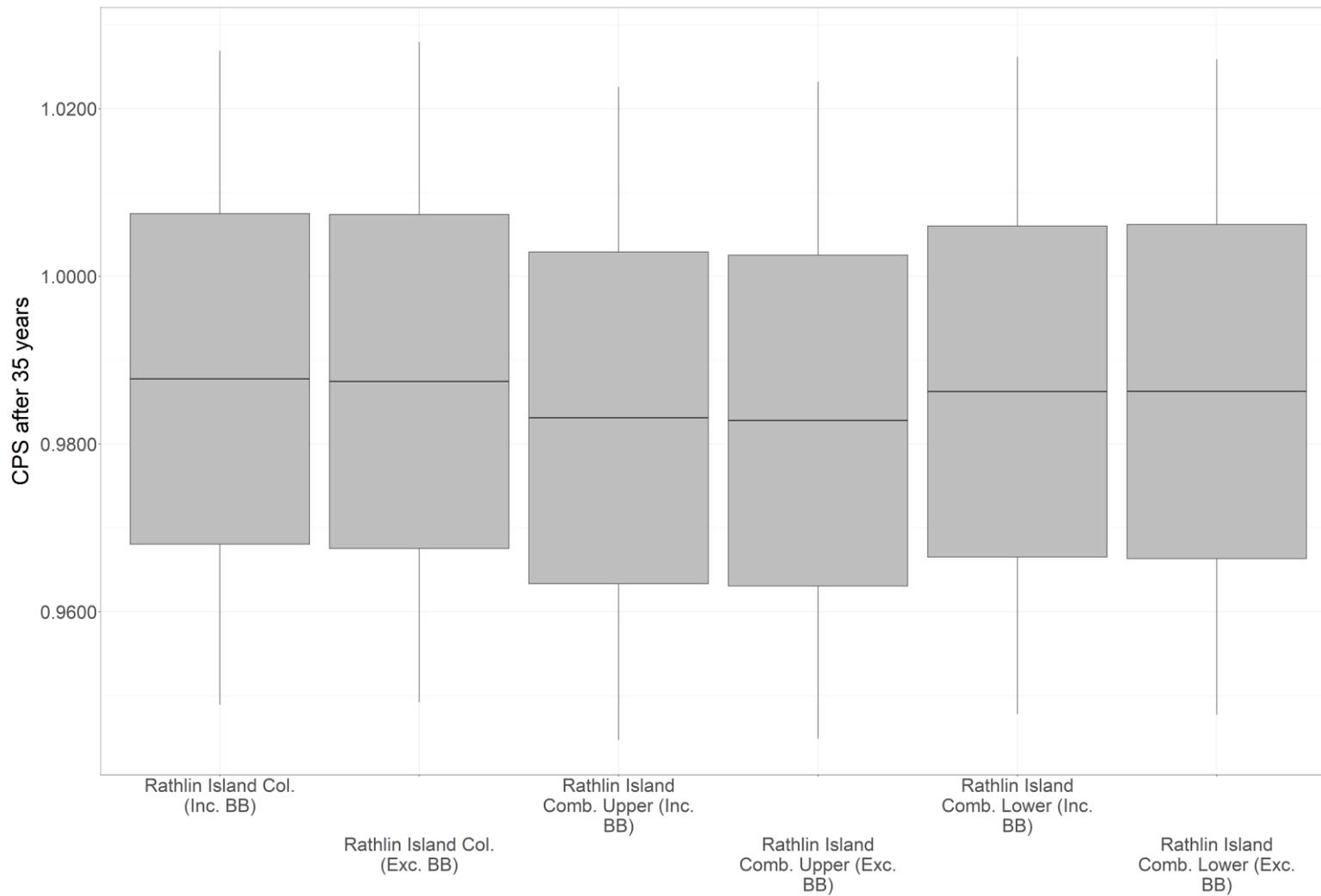


Plate 5-19 Kittiwake Population Projection over 35-50 Years at the West Westray SPA.

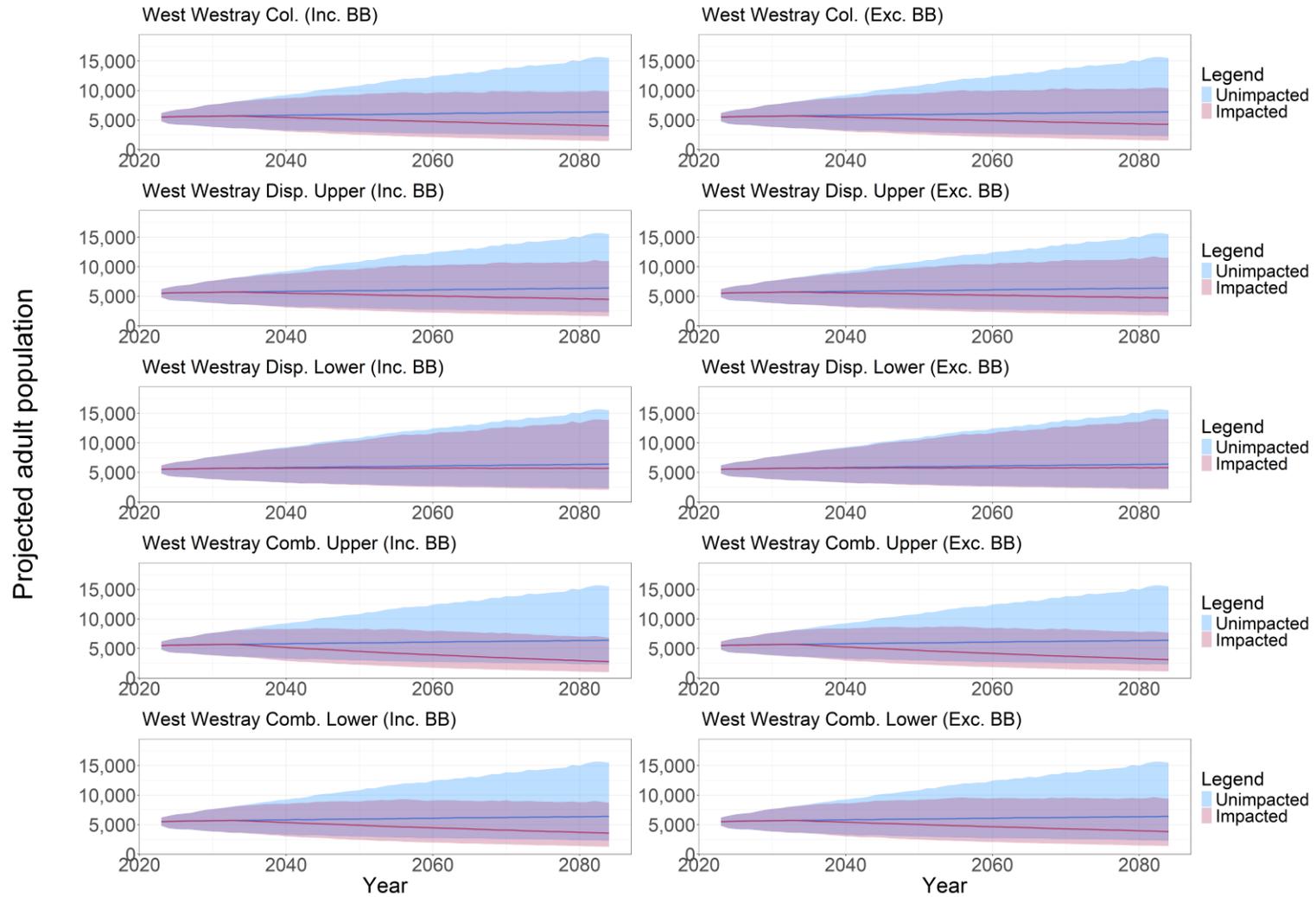


Plate 5-20 CGR after 35 Years for the Kittiwake Population at the West Westray SPA.

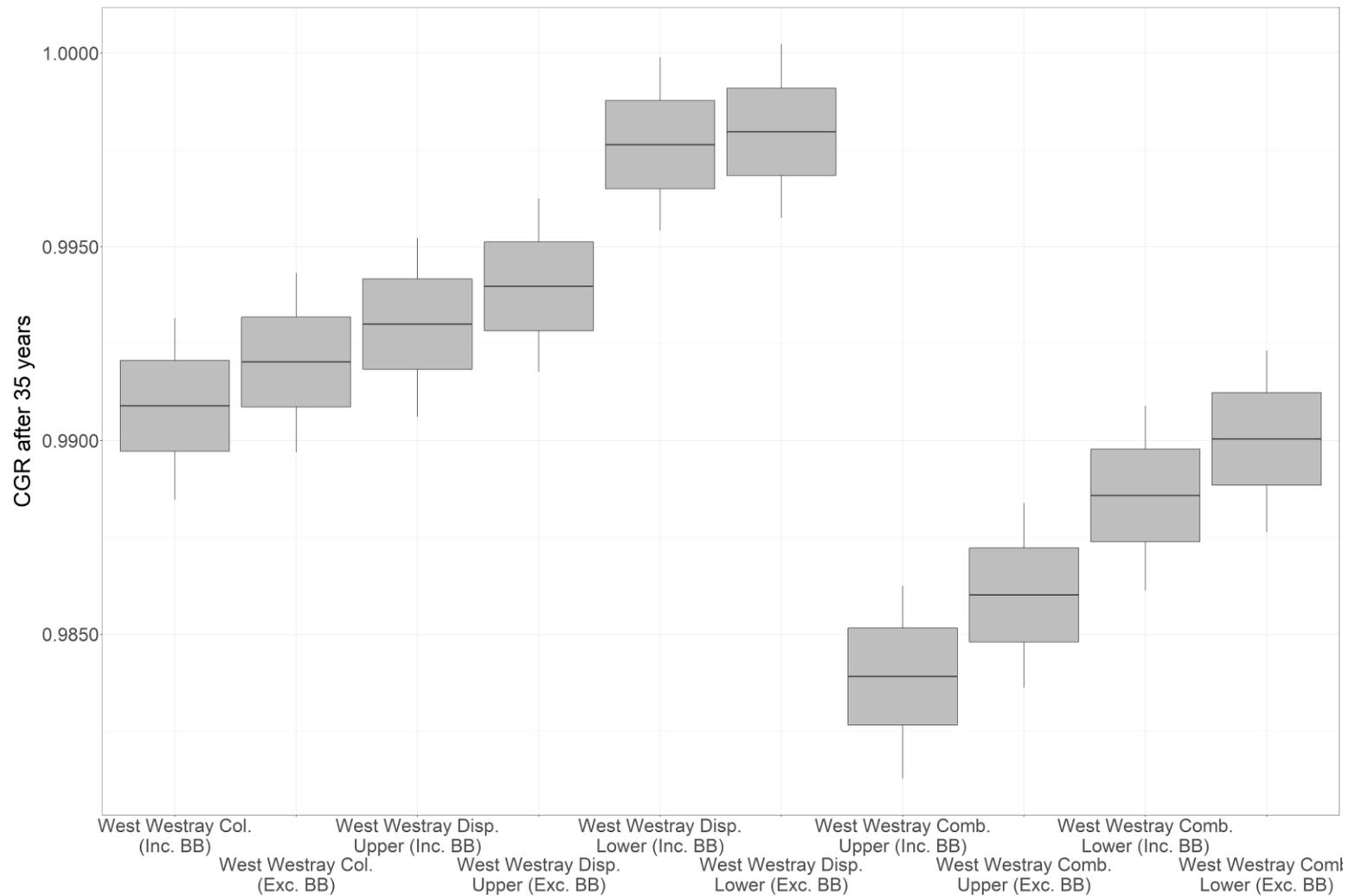
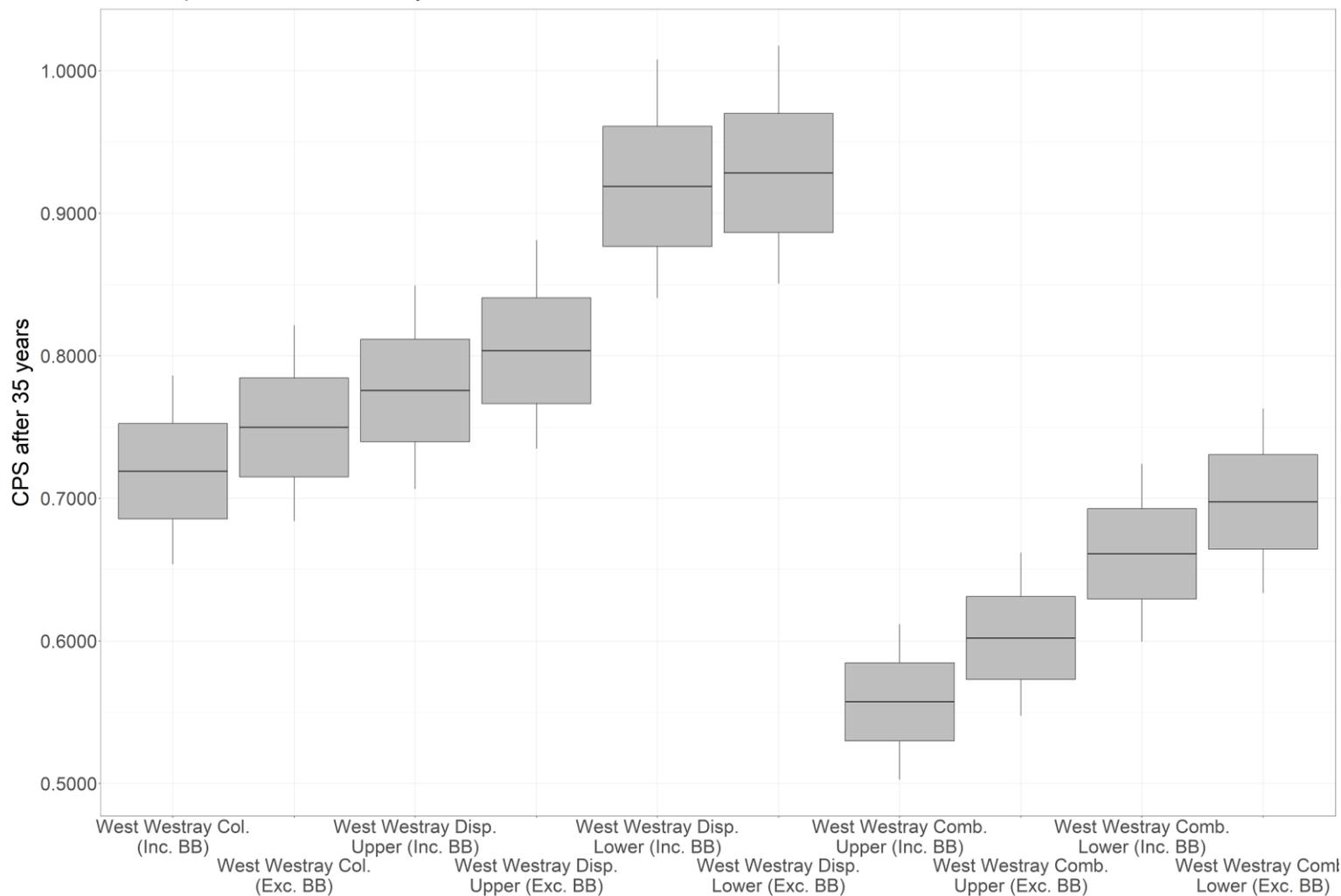


Plate 5-21 CPS after 35 Years for the Kittiwake Population at the West Westray SPA.





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5.2.2 GUILLEMOT

5.2.2.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the guillemot populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 5-2**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 5-22** to **Plate 5-36**.

Table 5-2 Offshore Project In-combination PVA Outputs for Guillemot After 35 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (after 35 years) | | | | | Quantiles | |
|-------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual Gr | Median Cgr | Median Cps | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 19.70 | 1.0256 | 0.9996 | 0.9847 | 0.04 | 1.53 | 46.14 | 54.14 |
| Flannan Isles SPA | Baseline | 0 | 1.0260 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 2.27 | 1.0257 | 0.9997 | 0.9883 | 0.03 | 1.17 | 47.10 | 53.26 |
| Handa SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 29.73 | 1.0256 | 0.9995 | 0.9838 | 0.05 | 1.62 | 46.30 | 54.12 |
| North Rona and Sula Sgeir SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 3.29 | 1.0257 | 0.9996 | 0.9873 | 0.04 | 1.27 | 46.40 | 53.34 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (after 35 years) | | | | | Quantiles | |
|--------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual Gr | Median Cgr | Median Cps | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Sule Skerry and Sule Stack SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 15.47 | 1.0246 | 0.9986 | 0.9498 | 0.14 | 5.02 | 37.06 | 61.84 |
| | Displacement NatureScot Lower (60/3/1) | 5.56 | 1.0255 | 0.9995 | 0.9814 | 0.05 | 1.86 | 45.40 | 54.02 |
| | Displacement Applicant (50/1/1) | 4.13 | 1.0257 | 0.9996 | 0.9865 | 0.04 | 1.35 | 46.84 | 52.72 |

5.2.2.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Displacement NatureScot Upper (60/5/3) is presented as 'Disp. Upper';
- Displacement NatureScot Lower (60/3/1) is presented as 'Disp. Lower';
- Displacement Applicant (50/1/1) is presented as 'Disp. App.'.

Plate 5-22 Guillemot Population Projection over 35-50 Years at the Cape Wrath SPA

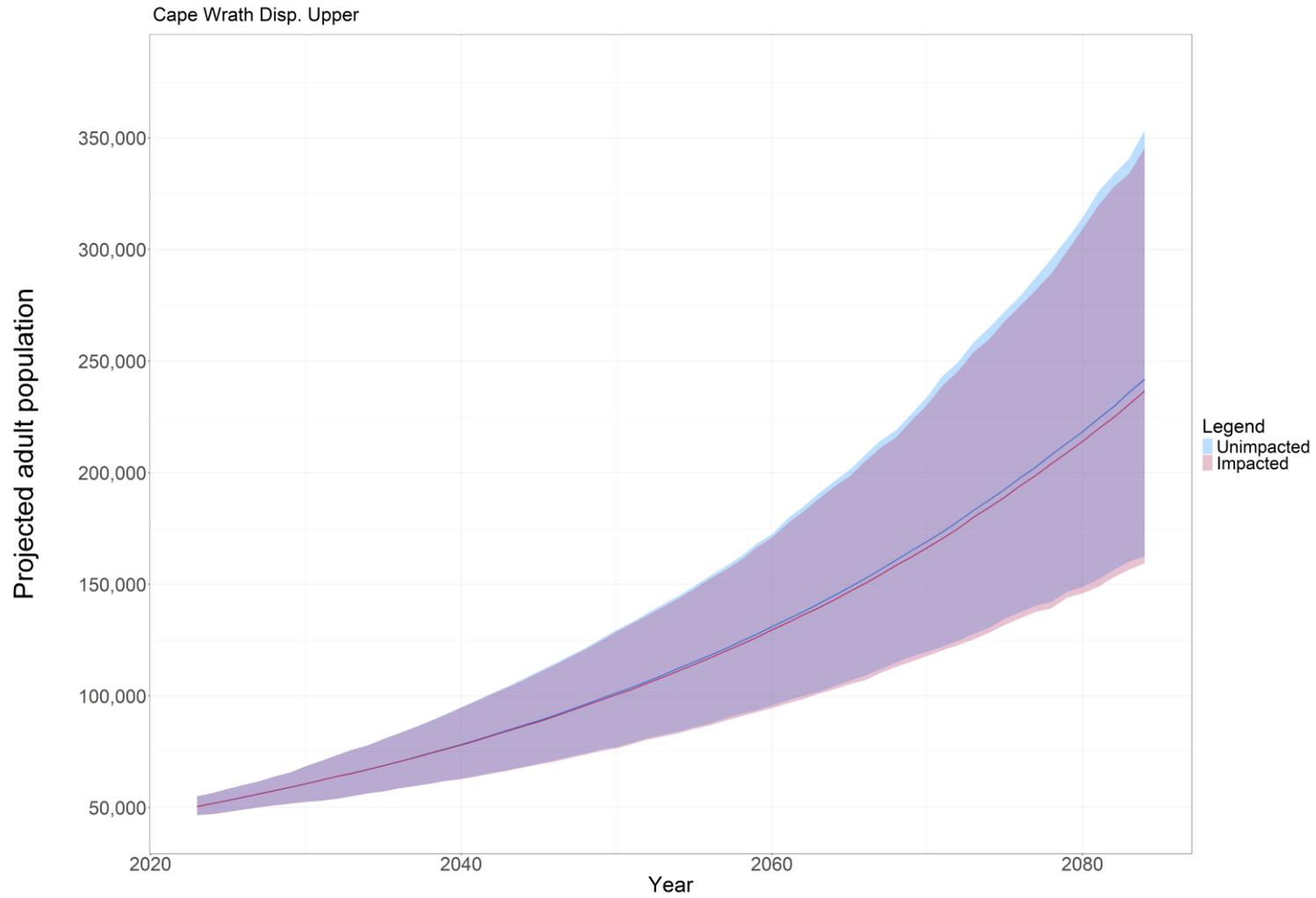


Plate 5-23 CGR after 35 Years for the Guillemot Population at the Cape Wrath SPA.

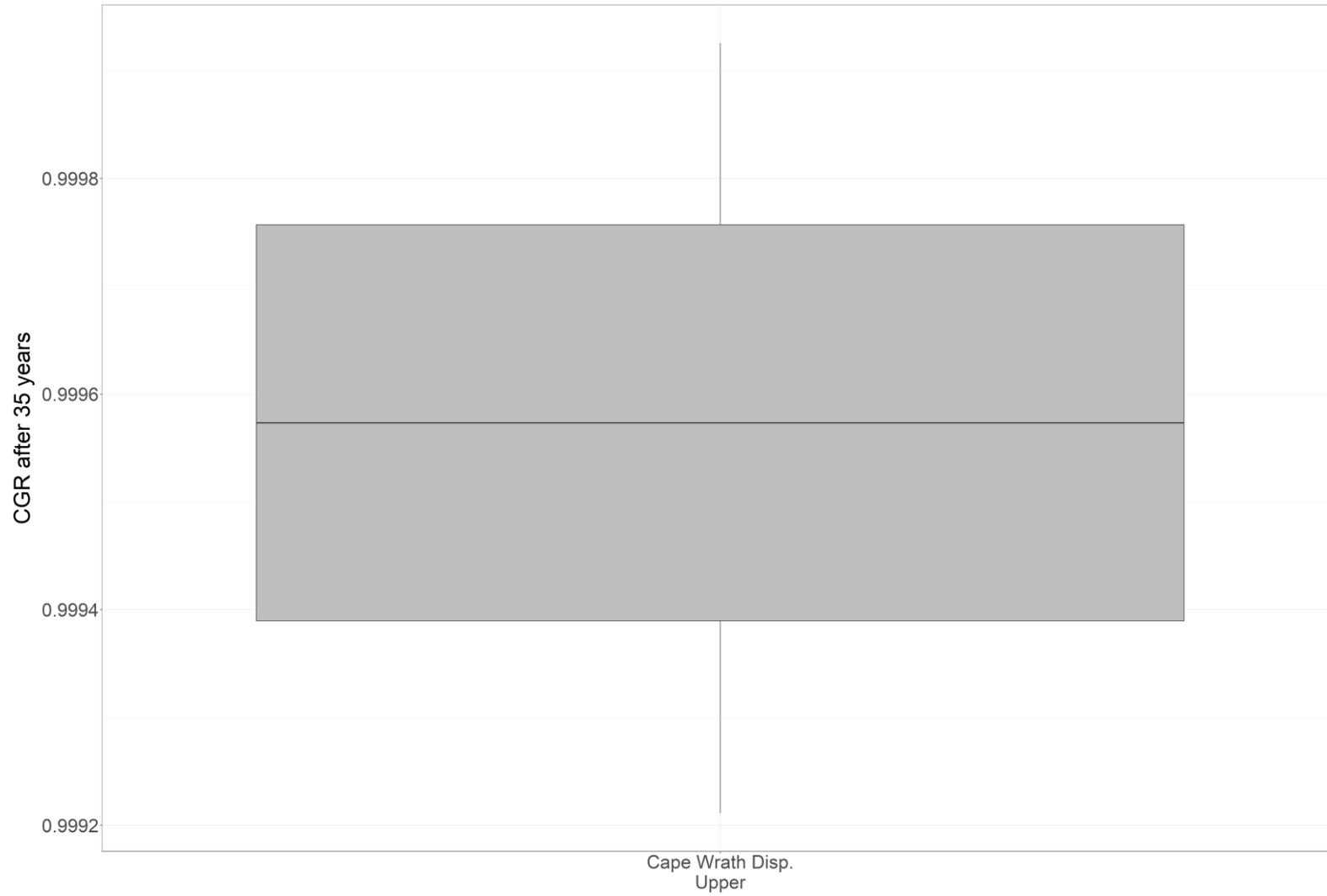


Plate 5-24 CPS after 35 Years for the Guillemot Population at the Cape Wrath SPA.

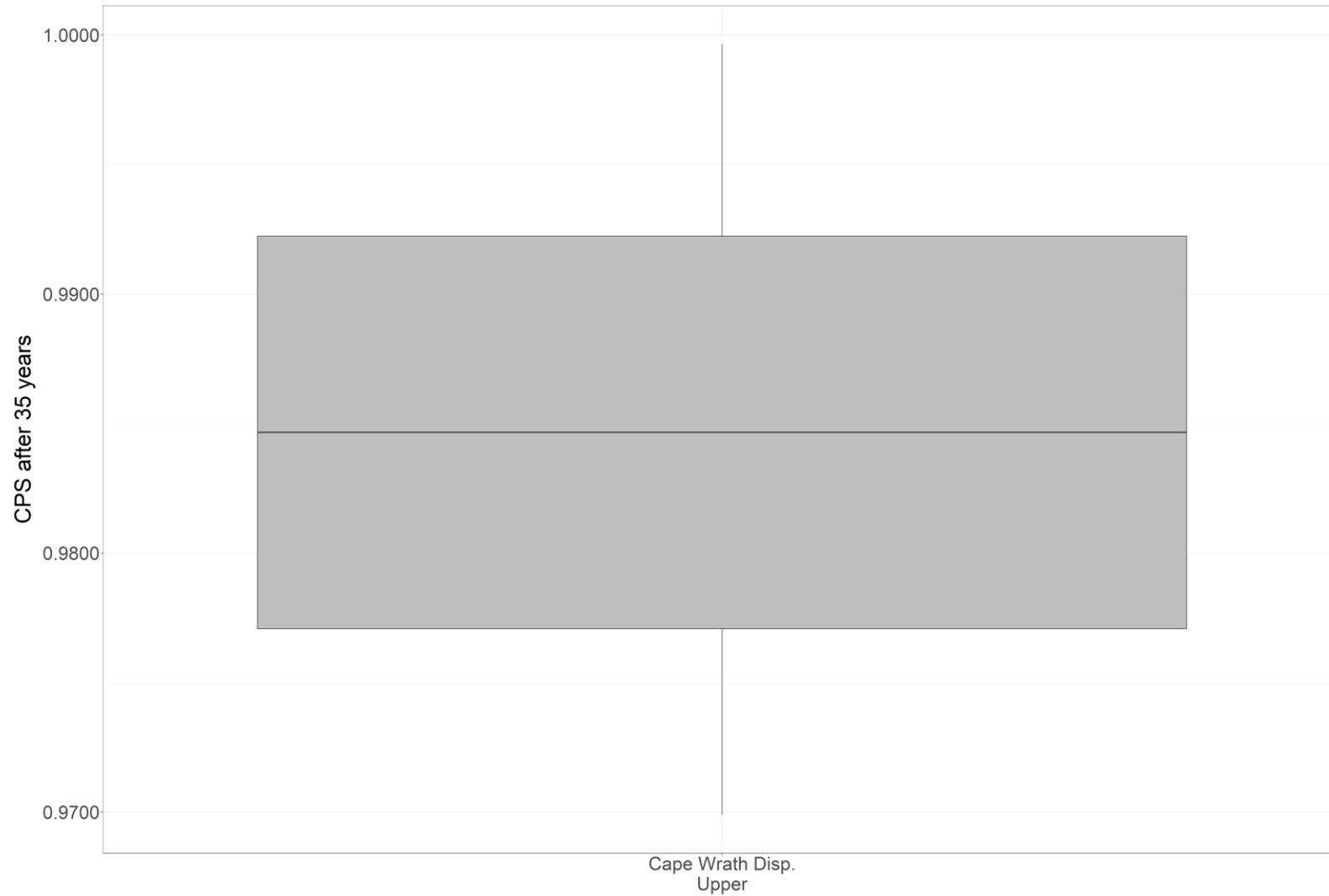


Plate 5-25 Guillemot Population Projection over 35-50 Years at the Flannan Isles SPA

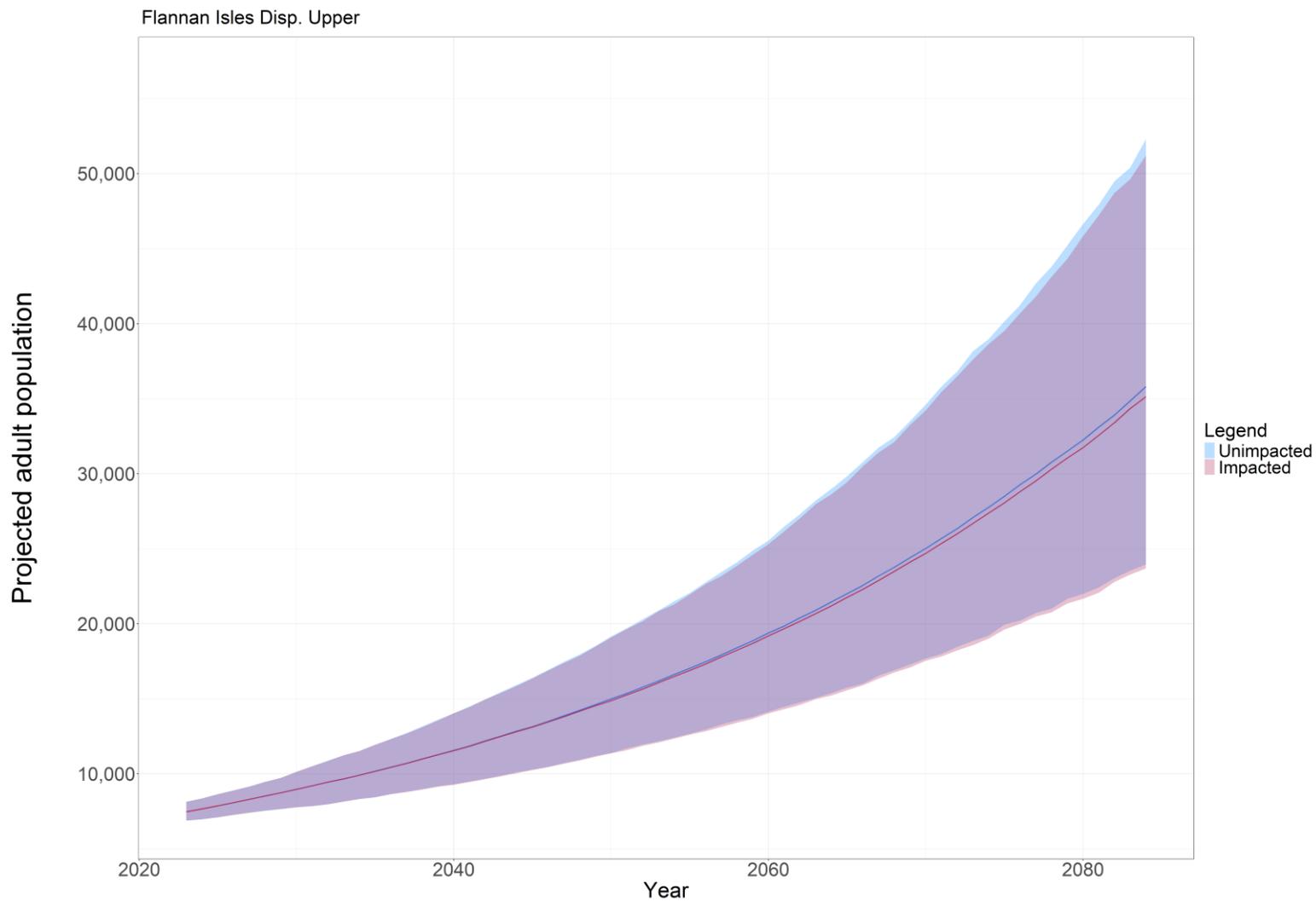


Plate 5-26 CGR after 35 Years for the Guillemot Population at the Flannan Isles SPA.

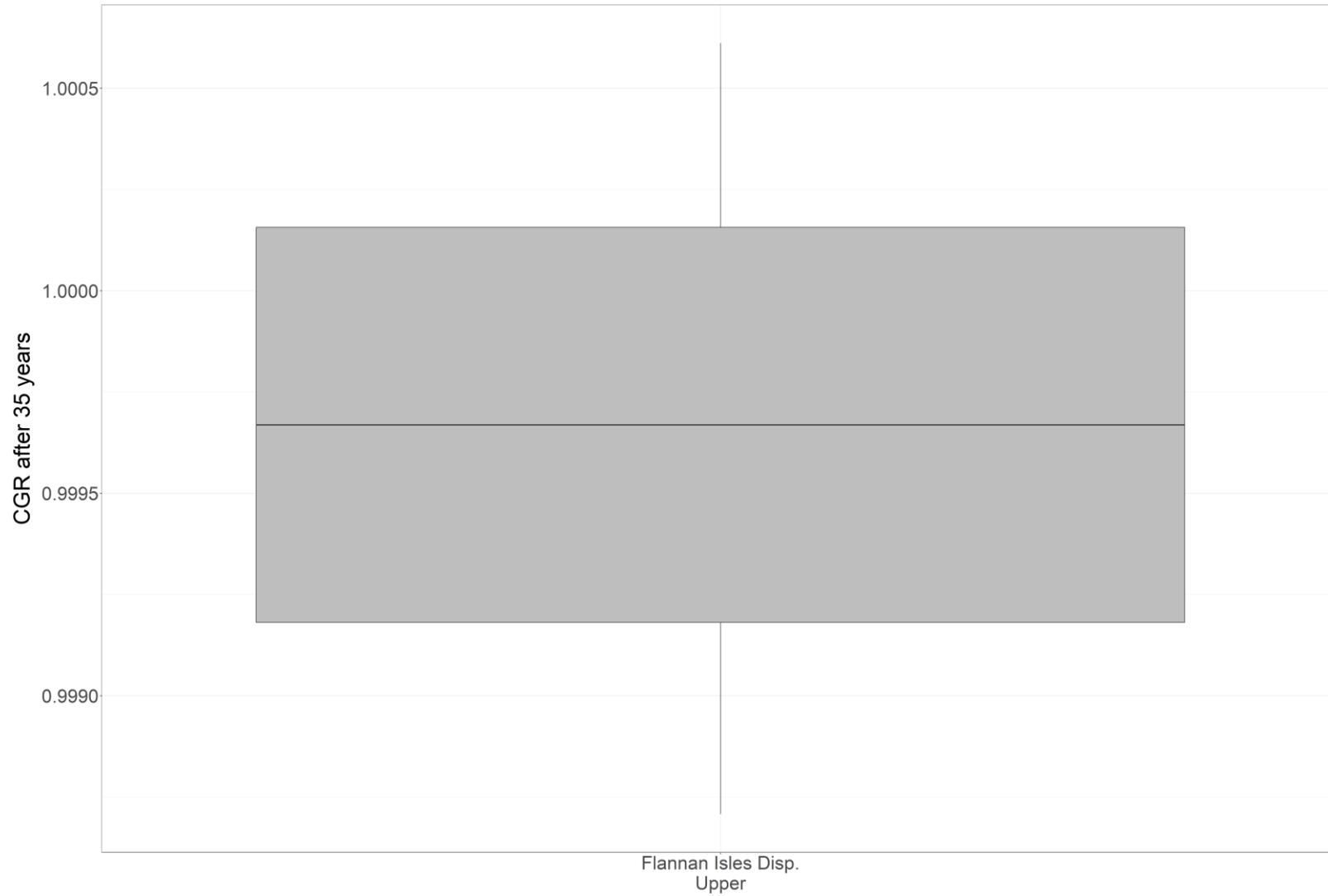


Plate 5-27 CPS after 35 Years for the Guillemot Population at the Flannan Isles SPA.

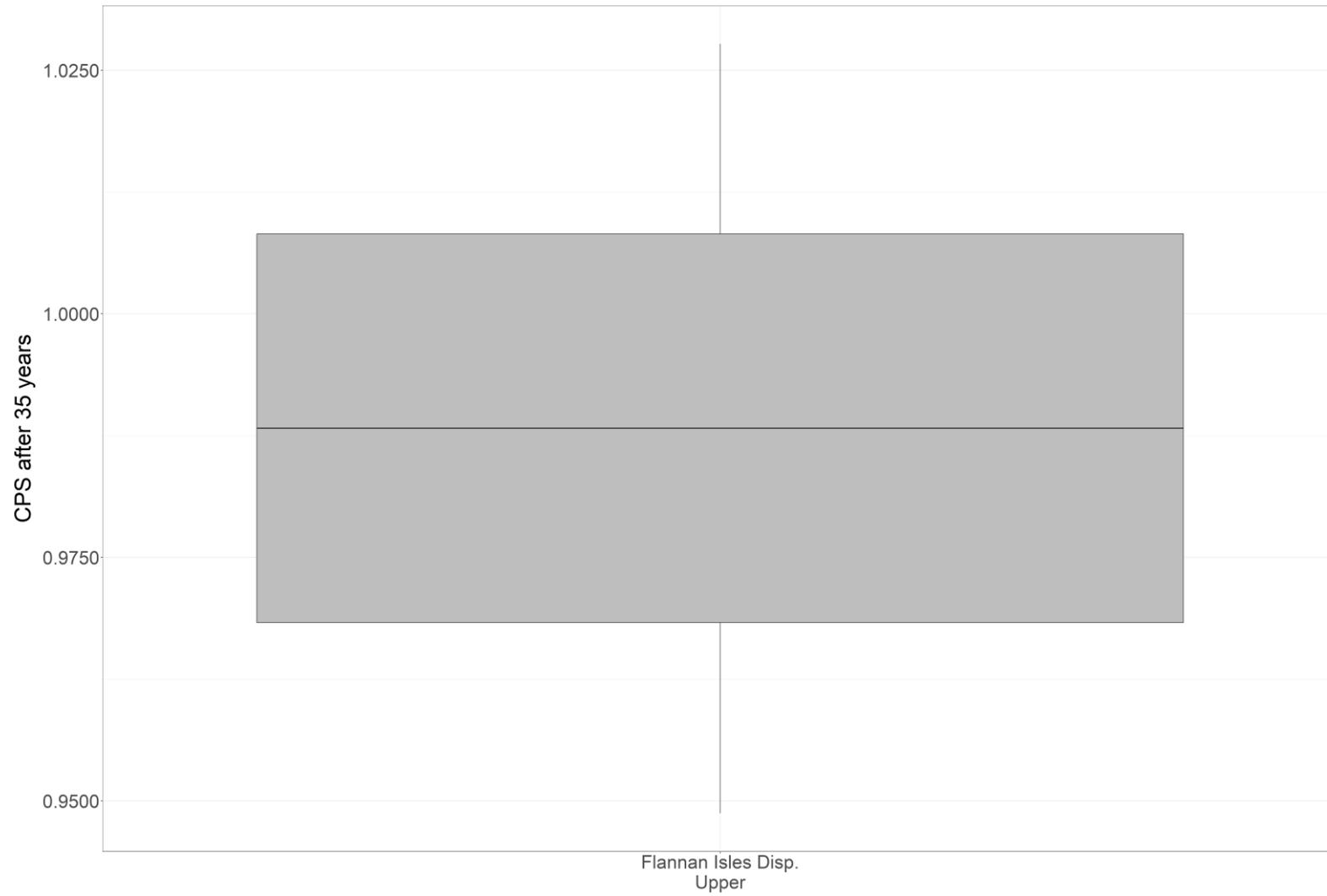


Plate 5-28 Guillemot Population Projection over 35-50 Years at the Handa SPA

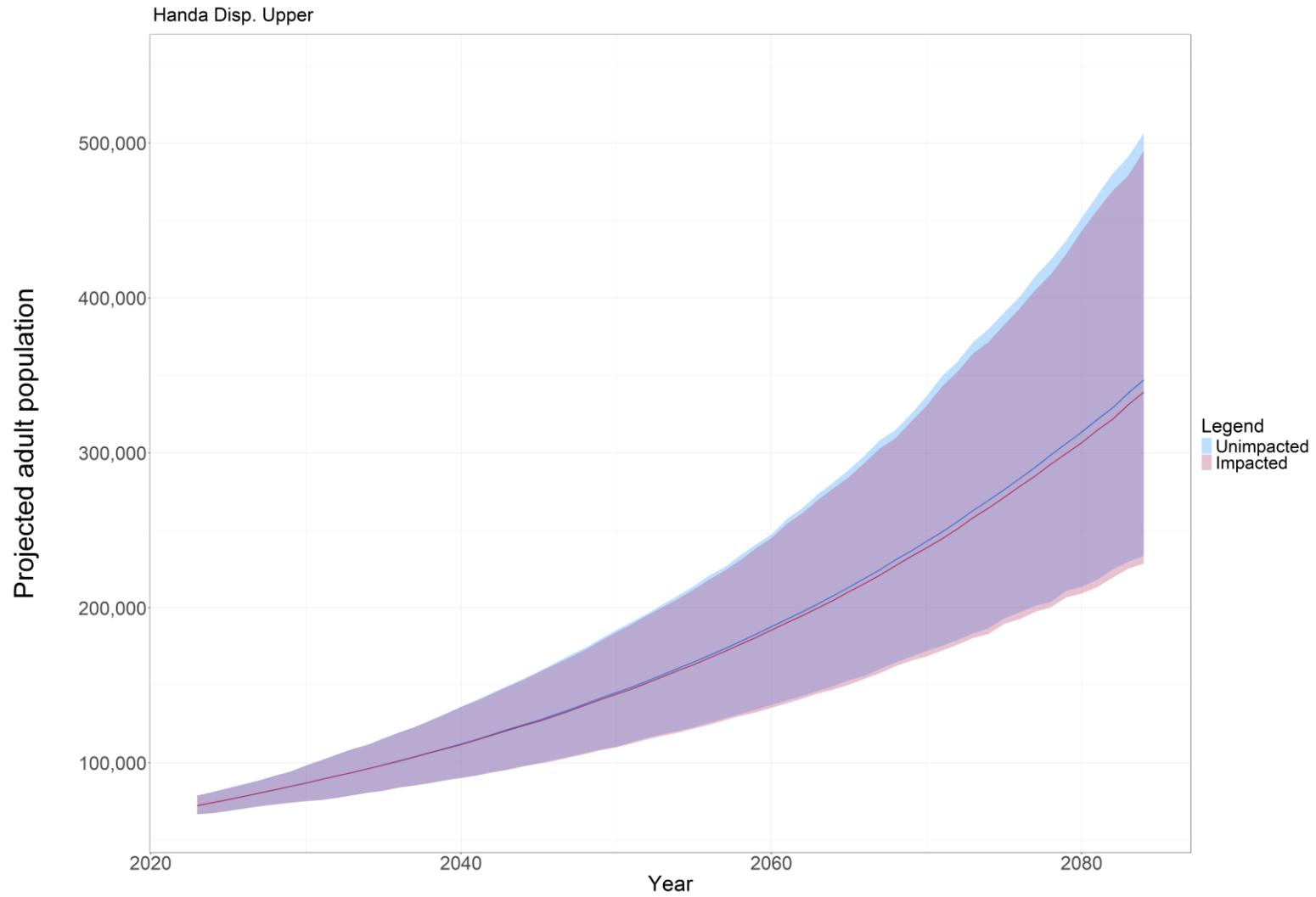


Plate 5-29 CGR after 35 Years for the Guillemot Population at the Handa SPA.

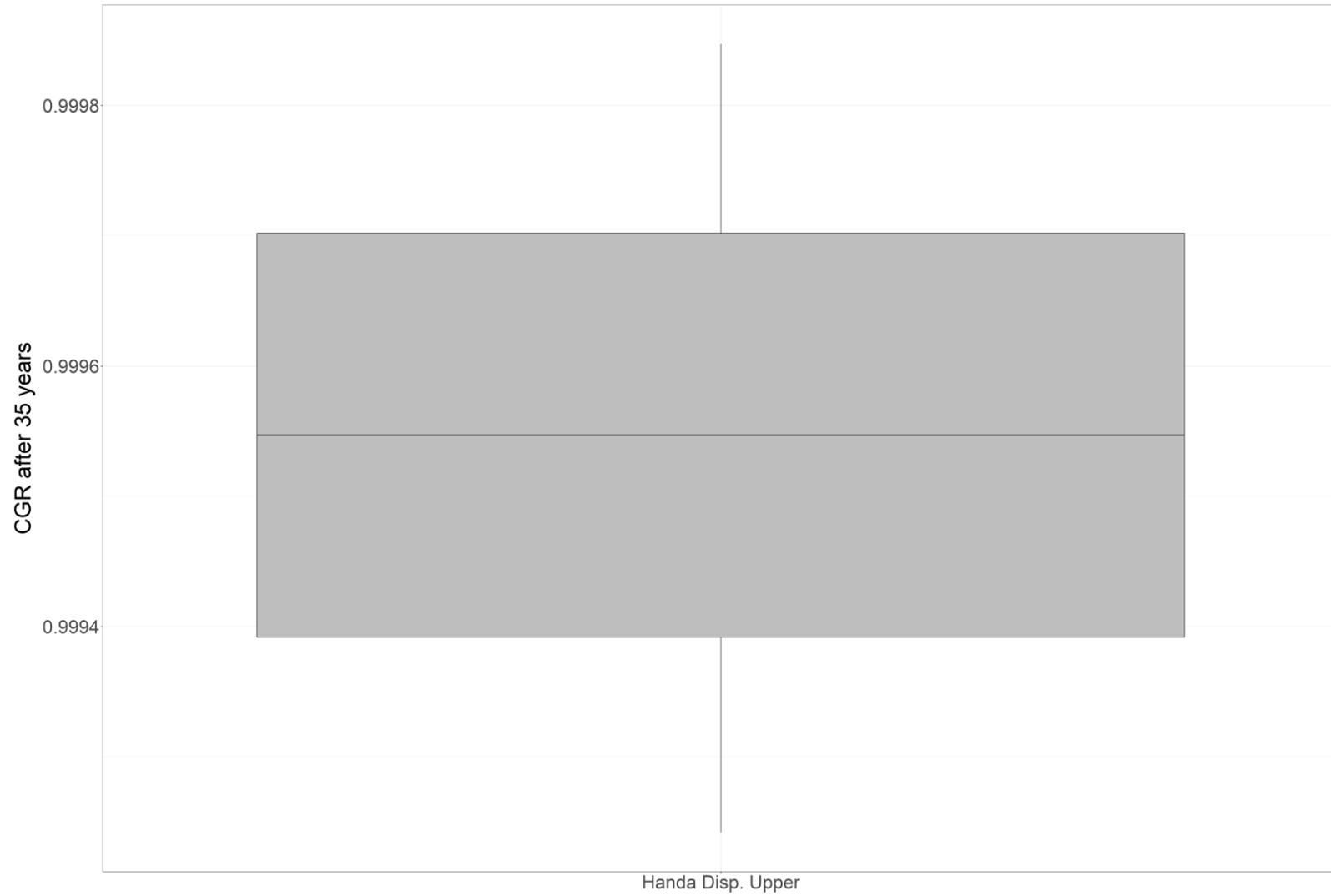


Plate 5-30 CPS after 35 Years for the Guillemot Population at the Handa SPA.



Plate 5-31 Guillemot Population Projection over 35-50 Years at the North Rona and Sula Sgeir SPA.

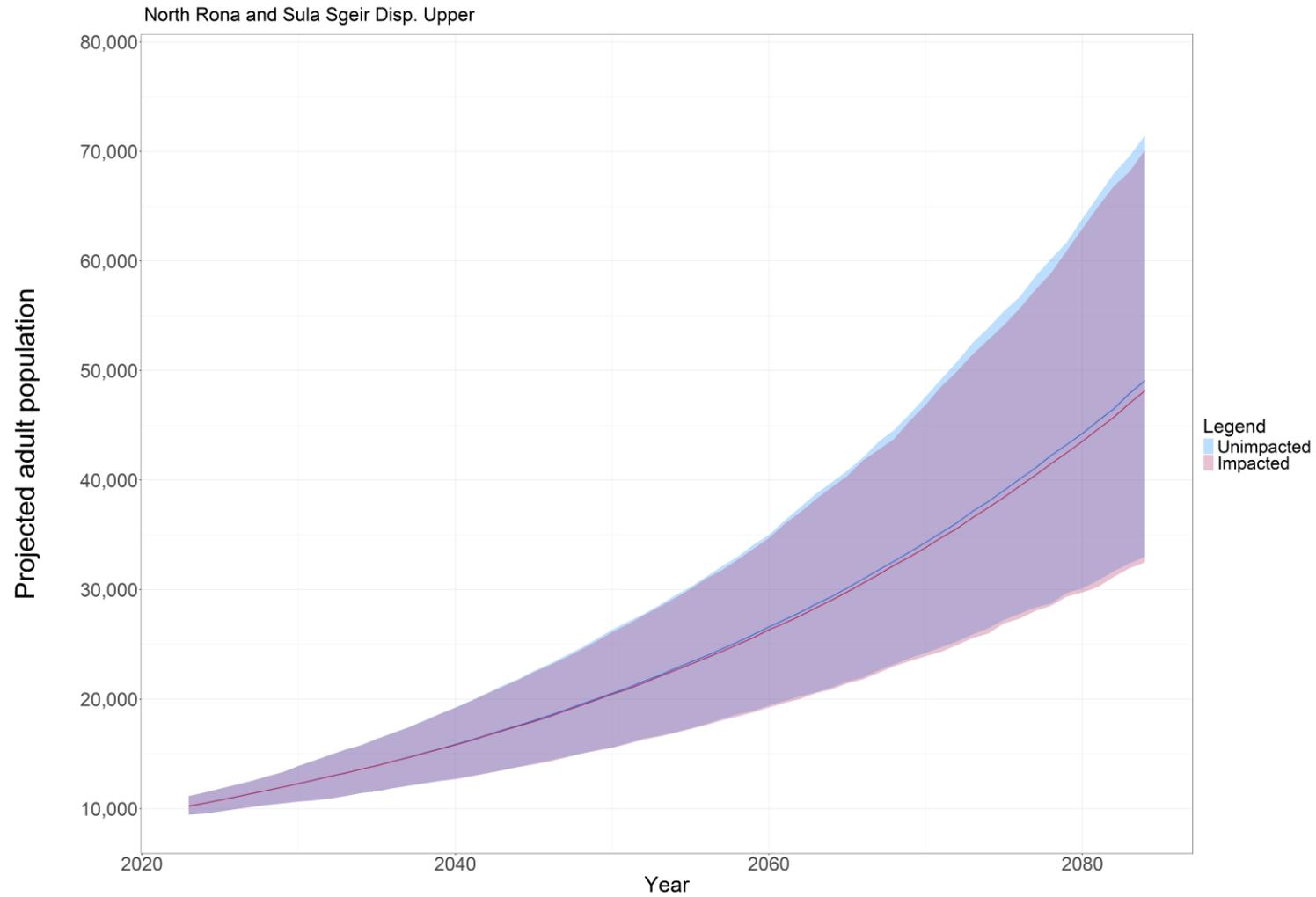


Plate 5-32 CGR after 35 Years for the Guillemot Population at the North Rona and Sula Sgeir SPA.

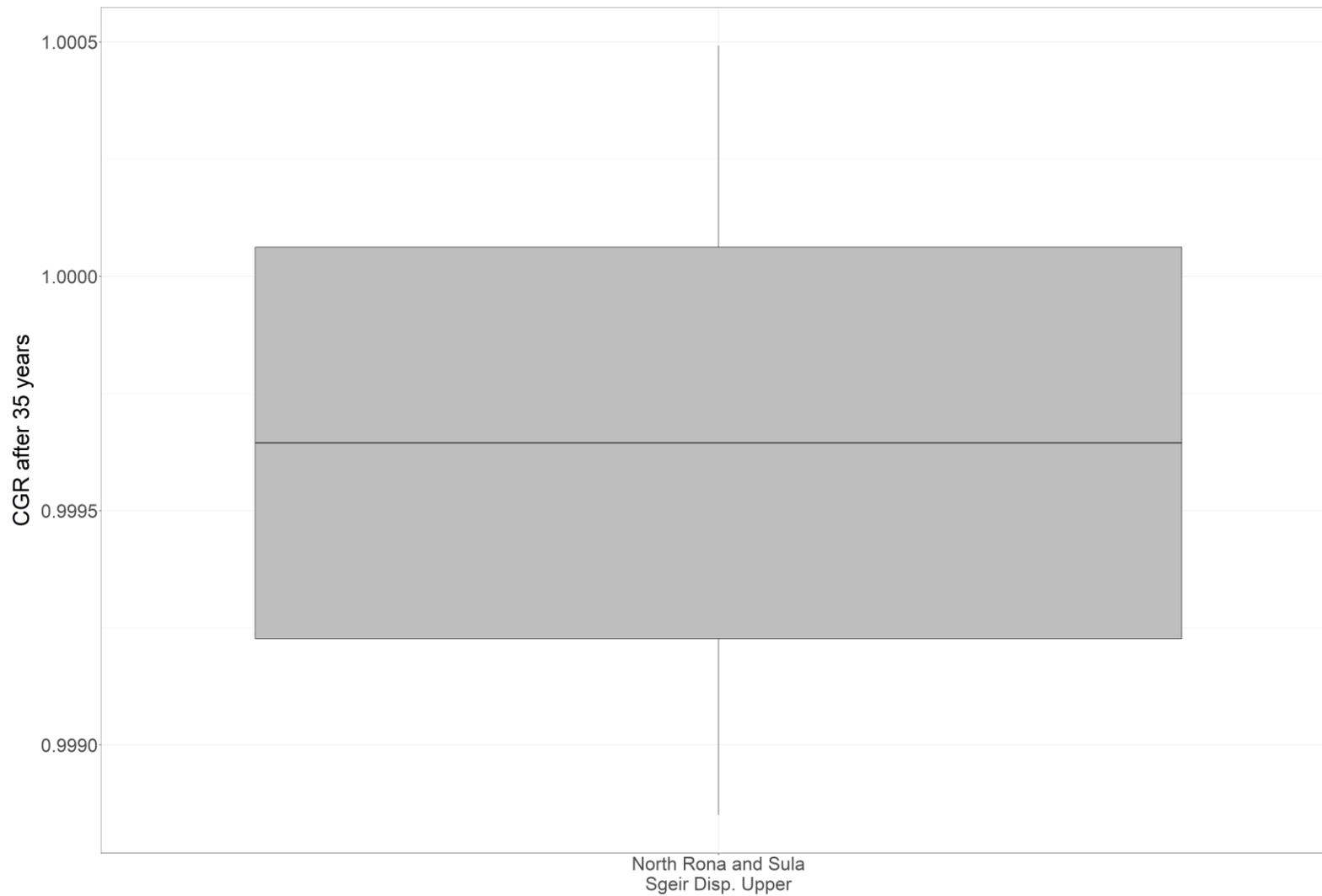


Plate 5-33 CPS after 35 Years for the Guillemot Population at the North Rona and Sula Sgeir SPA.

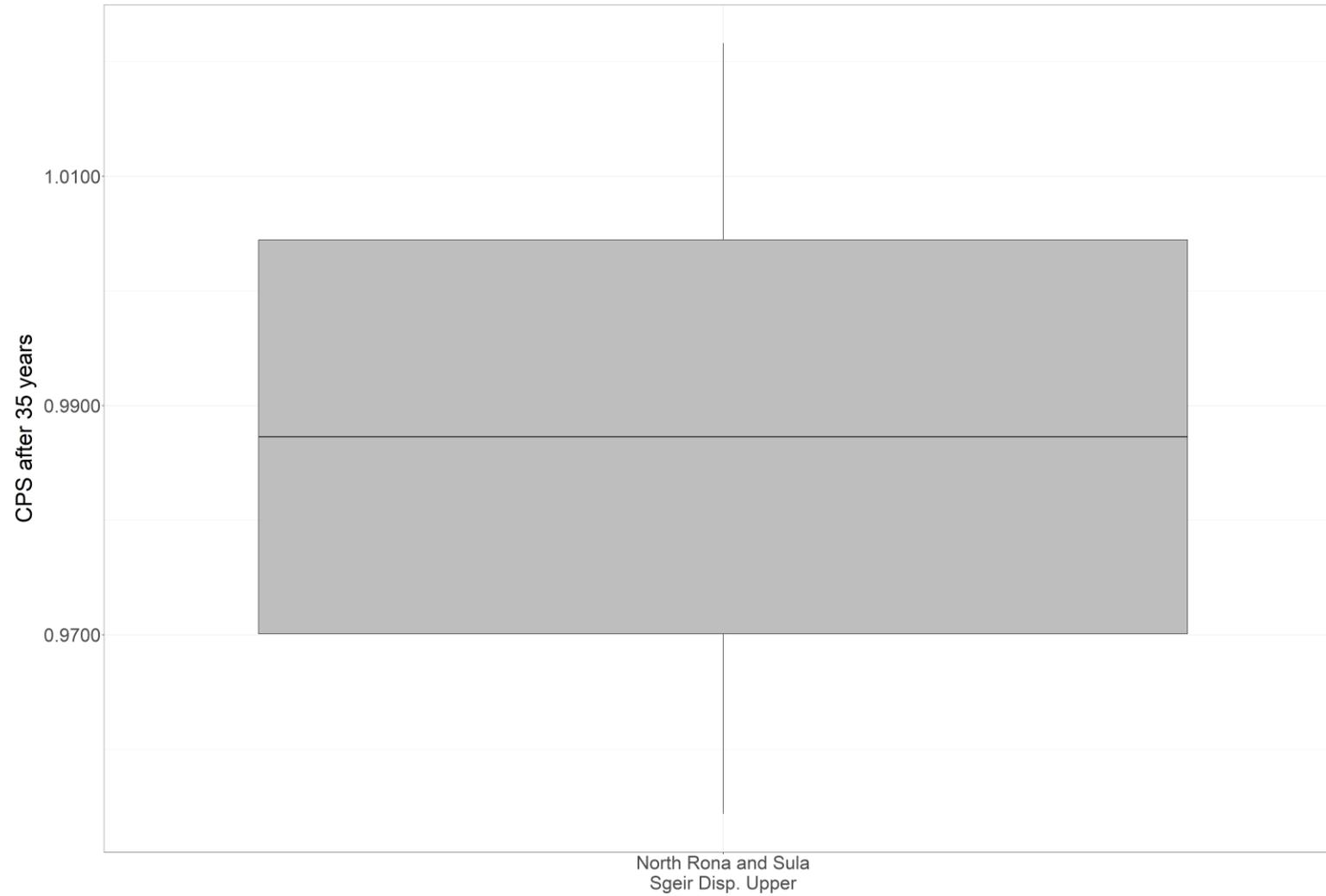


Plate 5-34 Guillemot Population Projection over 35-50 Years at the Sule Skerry and Sule Stack SPA.

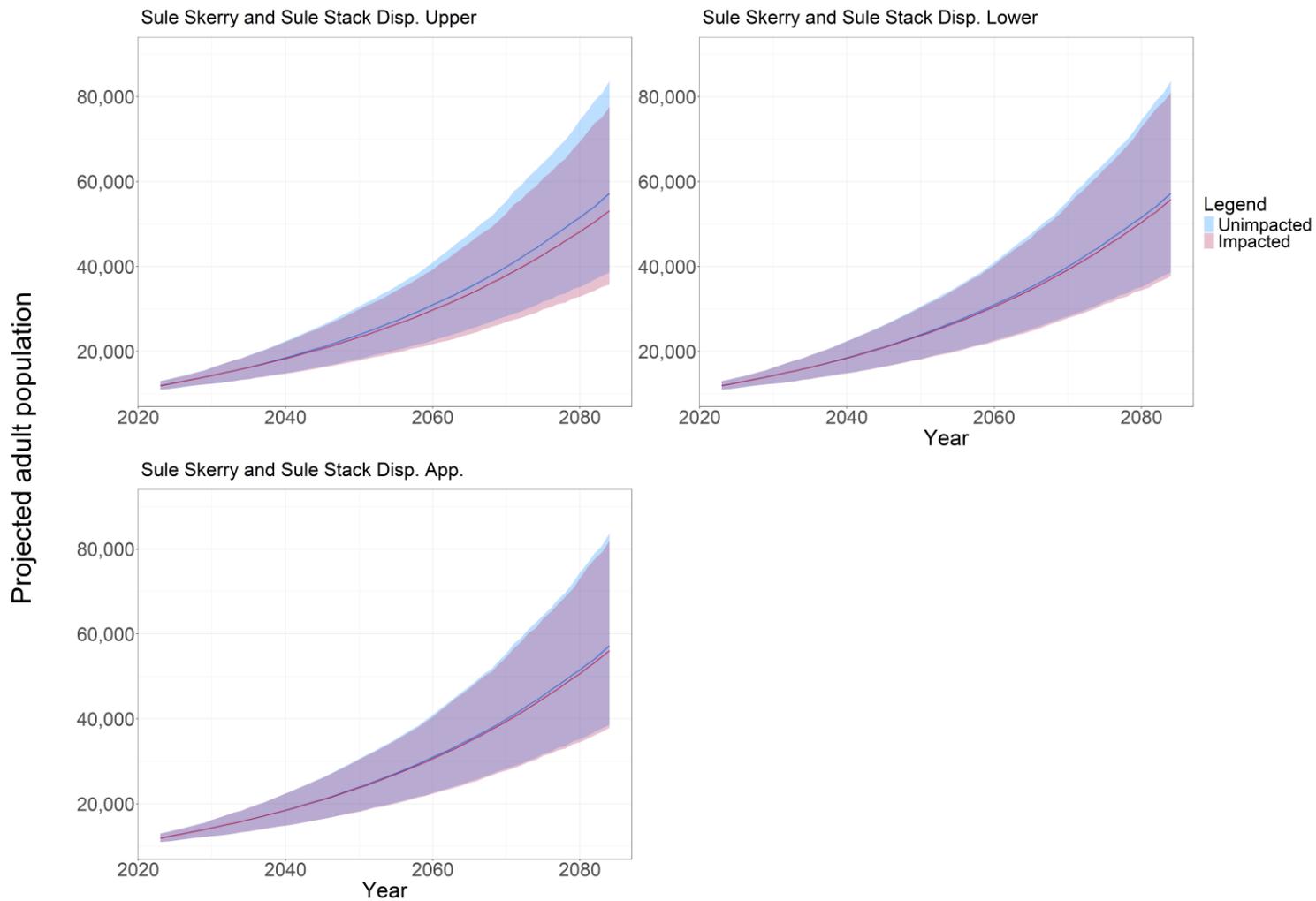


Plate 5-35 CGR after 35 Years for the Guillemot Population at the Sule Skerry and Sule Stack SPA.

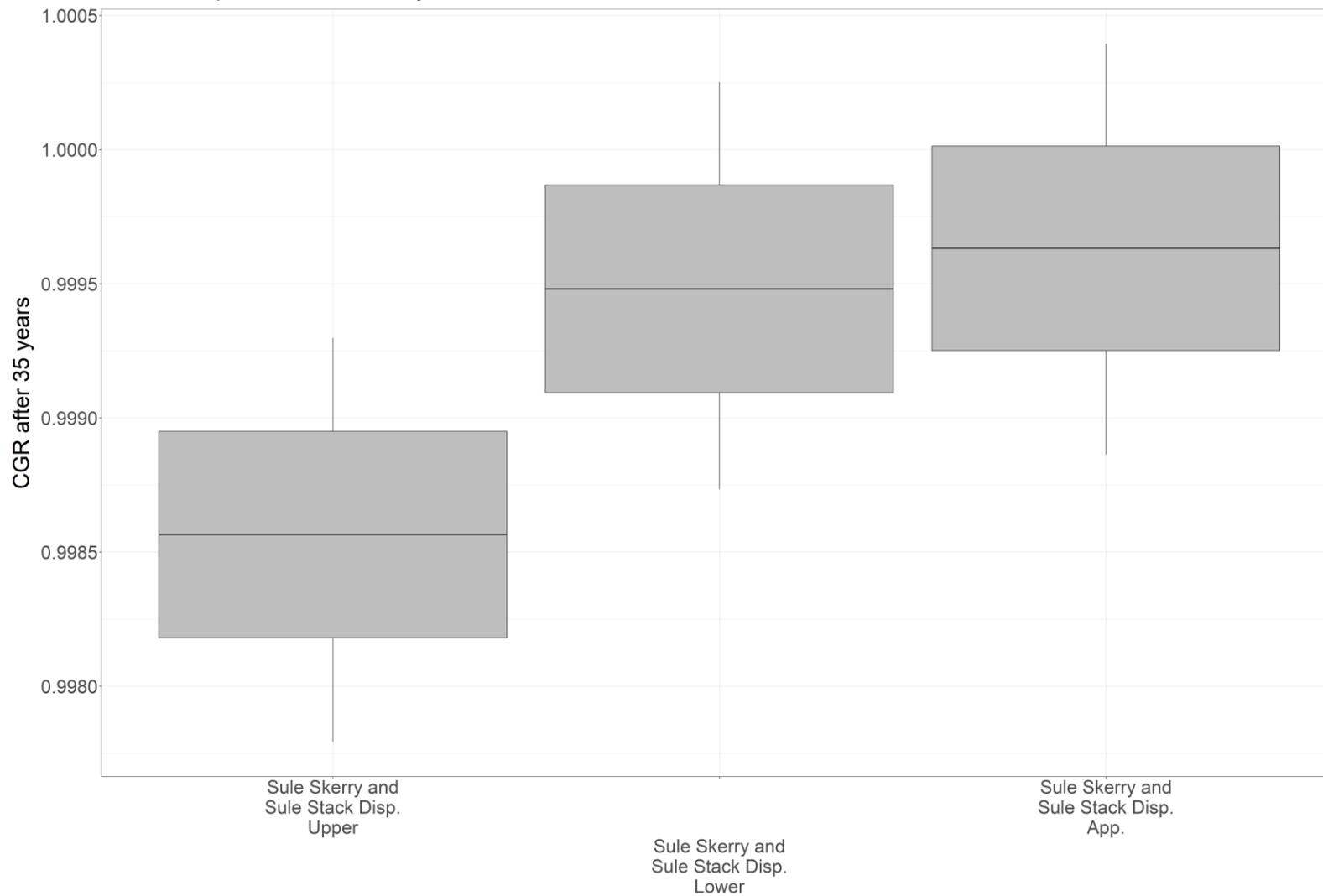
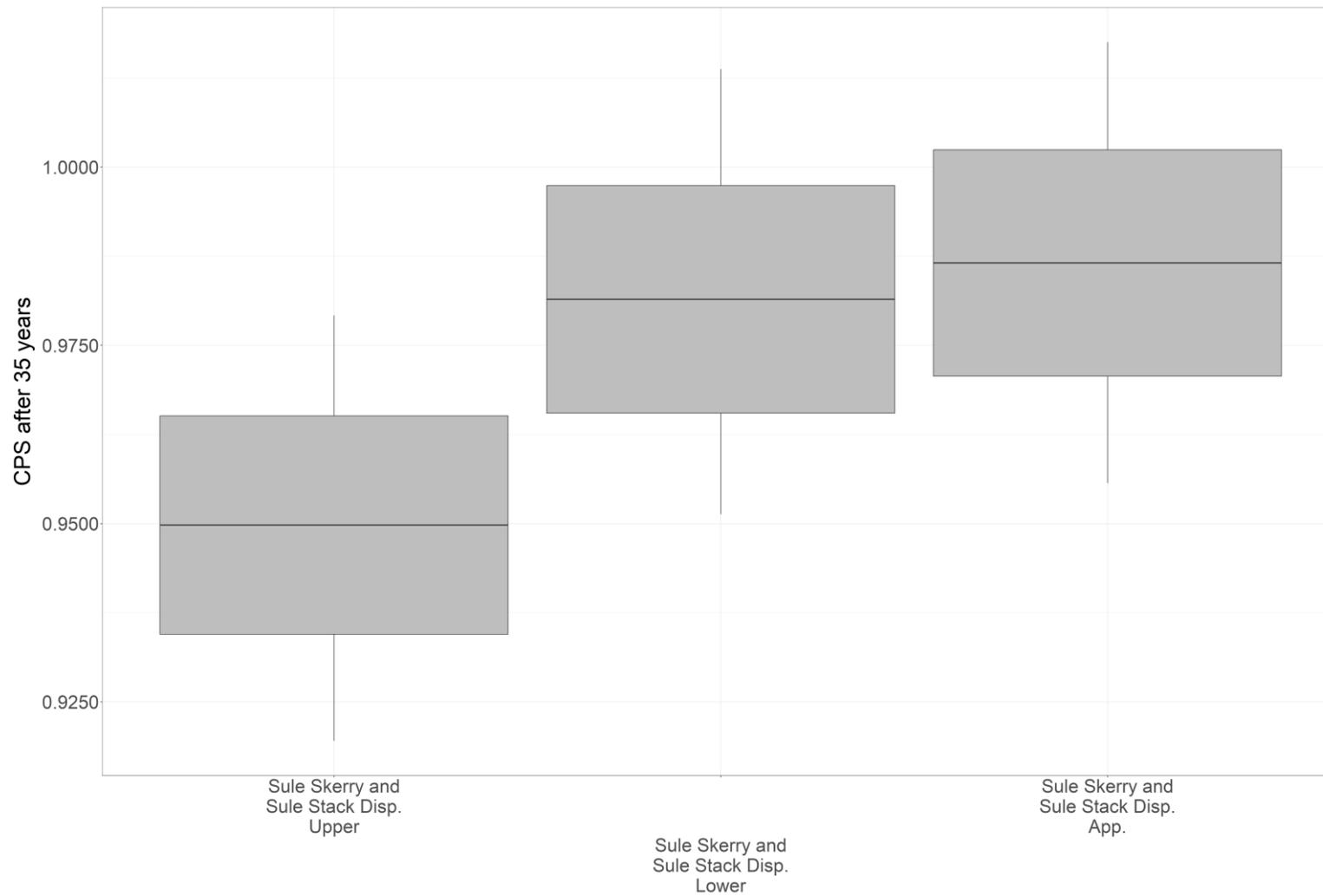


Plate 5-36 CPS after 35 Years for the Guillemot Population at the Sule Skerry and Sule Stack SPA.





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5.2.3 RAZORBILL

5.2.3.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the razorbill populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 5-3**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 5-37** to **Plate 5-60**.

Table 5-3 Offshore Project In-combination PVA Outputs for Razorbill After 35 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|----------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 0.9764 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 5.94 | 0.9749 | 0.9984 | 0.9444 | 0.16 | 5.56 | 44.08 | 55.74 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 5.85 | 0.9749 | 0.9984 | 0.9421 | 0.16 | 5.79 | 43.66 | 56.12 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 2.45 | 0.9758 | 0.9993 | 0.9755 | 0.07 | 2.45 | 47.14 | 52.36 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 2.42 | 0.9759 | 0.9994 | 0.9770 | 0.06 | 2.30 | 46.98 | 52.92 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| SPA | Displacement Applicant (50/1/1) (with Berwick Bank) | 1.45 | 0.9760 | 0.9996 | 0.9857 | 0.04 | 1.43 | 48.14 | 51.92 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 1.43 | 0.9760 | 0.9996 | 0.9852 | 0.04 | 1.48 | 48.30 | 51.60 |
| Flannan Isles SPA | Baseline | 0 | 0.9765 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 2.94 | 0.9741 | 0.9977 | 0.9208 | 0.23 | 7.92 | 41.26 | 58.76 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 2.90 | 0.9742 | 0.9977 | 0.9228 | 0.23 | 7.72 | 41.68 | 58.28 |
| | Displacement NatureScot Lower | 1.21 | 0.9755 | 0.9991 | 0.9641 | 0.09 | 3.59 | 46.18 | 53.56 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (60/3/1) (with Berwick Bank) | | | | | | | | |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 1.19 | 0.9754 | 0.9990 | 0.9626 | 0.10 | 3.74 | 46.40 | 53.58 |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 0.72 | 0.9757 | 0.9995 | 0.9797 | 0.05 | 2.03 | 47.10 | 52.76 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 0.71 | 0.9758 | 0.9994 | 0.9763 | 0.06 | 2.37 | 47.74 | 52.38 |
| Handa SPA | Baseline | 0 | 0.9764 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 13.61 | 0.9749 | 0.9986 | 0.9491 | 0.14 | 5.09 | 44.30 | 55.58 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 13.39 | 0.9750 | 0.9986 | 0.9498 | 0.14 | 5.02 | 44.30 | 55.86 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 5.42 | 0.9758 | 0.9994 | 0.9792 | 0.06 | 2.08 | 47.92 | 52.04 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 5.35 | 0.9758 | 0.9994 | 0.9799 | 0.06 | 2.01 | 47.80 | 52.04 |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 3.41 | 0.9761 | 0.9996 | 0.9868 | 0.04 | 1.32 | 48.70 | 51.20 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 3.35 | 0.9761 | 0.9996 | 0.9872 | 0.04 | 1.28 | 48.54 | 51.44 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|---------------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Mingulay and Berneray SPA | Baseline | 0 | 0.9765 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 20.14 | 0.9755 | 0.9991 | 0.9687 | 0.09 | 3.13 | 46.58 | 53.18 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 19.71 | 0.9756 | 0.9991 | 0.9691 | 0.09 | 3.09 | 46.62 | 53.2 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 6.71 | 0.9761 | 0.9997 | 0.9889 | 0.03 | 1.11 | 48.92 | 50.96 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 6.60 | 0.9762 | 0.9997 | 0.9900 | 0.03 | 1.00 | 48.92 | 51.16 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|--------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| SPA | Displacement Applicant (50/1/1) (with Berwick Bank) | 5.60 | 0.9761 | 0.9998 | 0.9912 | 0.02 | 0.88 | 49.14 | 51.08 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 5.47 | 0.9761 | 0.9998 | 0.9915 | 0.02 | 0.85 | 49.28 | 50.78 |
| Rathlin Island SPA | Baseline | 0 | 0.9765 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 25.38 | 0.9755 | 0.9990 | 0.9645 | 0.10 | 3.55 | 45.90 | 54.06 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 24.89 | 0.9755 | 0.9990 | 0.9654 | 0.10 | 3.46 | 45.52 | 53.92 |
| | Displacement NatureScot Lower | 8.47 | 0.9761 | 0.9997 | 0.9879 | 0.03 | 1.21 | 48.70 | 51.46 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (60/3/1) (with Berwick Bank) | | | | | | | | |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 8.31 | 0.9761 | 0.9997 | 0.9886 | 0.03 | 1.14 | 48.76 | 51.52 |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 7.05 | 0.9762 | 0.9997 | 0.9902 | 0.03 | 0.98 | 48.98 | 51.12 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 6.91 | 0.9762 | 0.9997 | 0.9899 | 0.03 | 1.01 | 48.98 | 51.14 |
| Shiant Isles SPA | Baseline | 0 | 0.9765 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 10.54 | 0.9752 | 0.9988 | 0.9586 | 0.12 | 4.14 | 45.28 | 54.46 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 10.36 | 0.9754 | 0.9989 | 0.9603 | 0.11 | 3.97 | 45.56 | 54.66 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 4.07 | 0.9760 | 0.9995 | 0.9837 | 0.05 | 1.63 | 47.96 | 52.02 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 4.01 | 0.9760 | 0.9995 | 0.9833 | 0.05 | 1.67 | 48.06 | 52.12 |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 2.70 | 0.9761 | 0.9997 | 0.9895 | 0.03 | 1.05 | 48.42 | 51.54 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 2.65 | 0.9762 | 0.9997 | 0.9897 | 0.03 | 1.03 | 48.80 | 51.26 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|---|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Skomer, Skokholm and the Seas off Pembrokeshire SPA | Baseline | 0 | 0.9764 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 13.19 | 0.9754 | 0.9990 | 0.9662 | 0.10 | 3.38 | 46.54 | 53.82 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 13.01 | 0.9755 | 0.9990 | 0.9658 | 0.10 | 3.42 | 46.22 | 53.98 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 5.42 | 0.9761 | 0.9996 | 0.9863 | 0.04 | 1.37 | 48.12 | 51.64 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 5.35 | 0.9760 | 0.9996 | 0.9864 | 0.04 | 1.36 | 48.34 | 51.38 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|--------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 3.24 | 0.9762 | 0.9998 | 0.9921 | 0.02 | 0.79 | 49.18 | 50.60 |
| St Kilda SPA | Baseline | 0 | 0.9765 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 3.48 | 0.9729 | 0.9963 | 0.8719 | 0.37 | 12.81 | 37.20 | 63.72 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 3.41 | 0.9729 | 0.9964 | 0.8750 | 0.36 | 12.50 | 36.54 | 63.90 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 1.19 | 0.9751 | 0.9987 | 0.9500 | 0.13 | 5.00 | 45.18 | 55.20 |
| | Displacement NatureScot Lower | 1.16 | 0.9751 | 0.9986 | 0.9508 | 0.14 | 4.92 | 45.18 | 55.36 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (60/3/1) (without Berwick Bank) | | | | | | | | |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 0.96 | 0.9755 | 0.9990 | 0.9606 | 0.10 | 3.94 | 46.4 2 | 54.46 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 0.94 | 0.9753 | 0.9989 | 0.9626 | 0.11 | 3.74 | 46.0 2 | 54.48 |

5.2.3.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Displacement NatureScot Upper (60/5/3) is presented as 'Disp. Upper';
- Displacement NatureScot Lower (60/3/1) is presented as 'Disp. Lower';
- Displacement Applicant (50/1/1) is presented as 'Disp. App.';
- The scenarios with Berwick Bank are presented as '(Inc. BB)';
- The scenarios without Berwick Bank are presented as '(Exc. BB).

5.2.3.3 Within the plates Skomer, Skokholm and the Seas off Pembrokeshire SPA has been shorted to 'SSSP' to aid readability.

Plate 5-37 Razorbill Population Projection over 35-50 Years at the Cape Wrath SPA

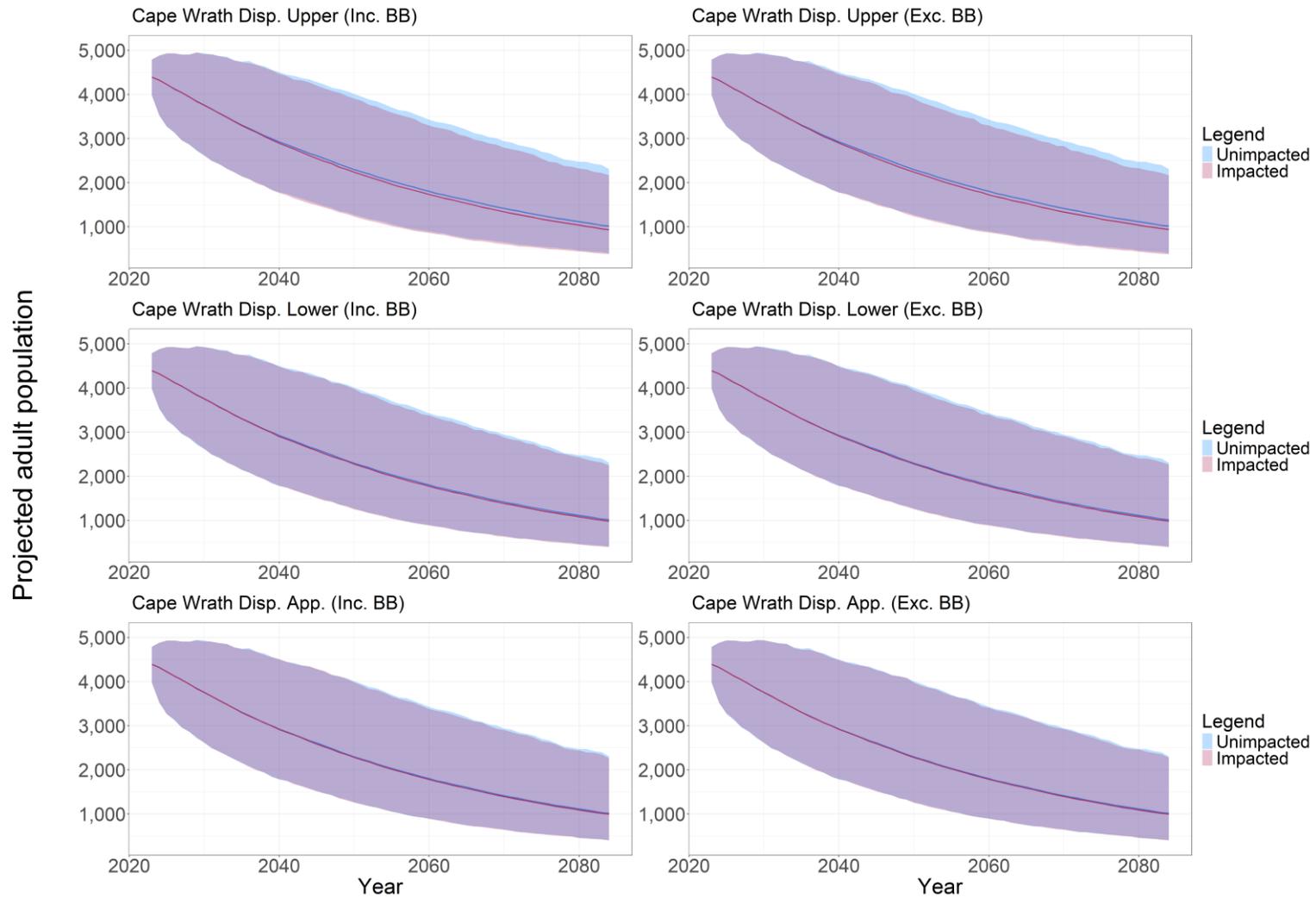


Plate 5-38 CGR after 35 Years for the Razorbill Population at the Cape Wrath SPA.

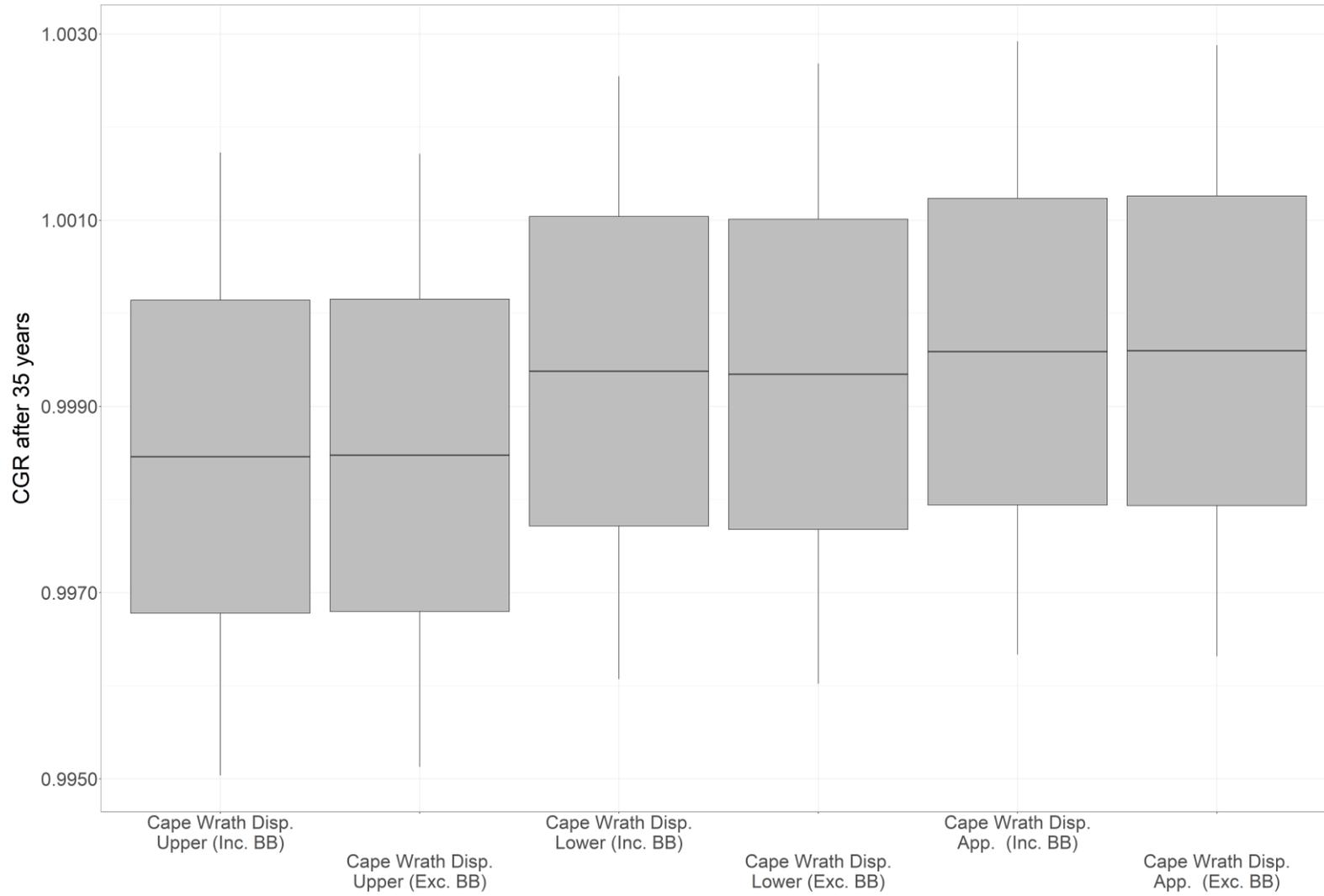


Plate 5-39 CPS after 35 Years for the Razorbill Population at the Cape Wrath SPA.

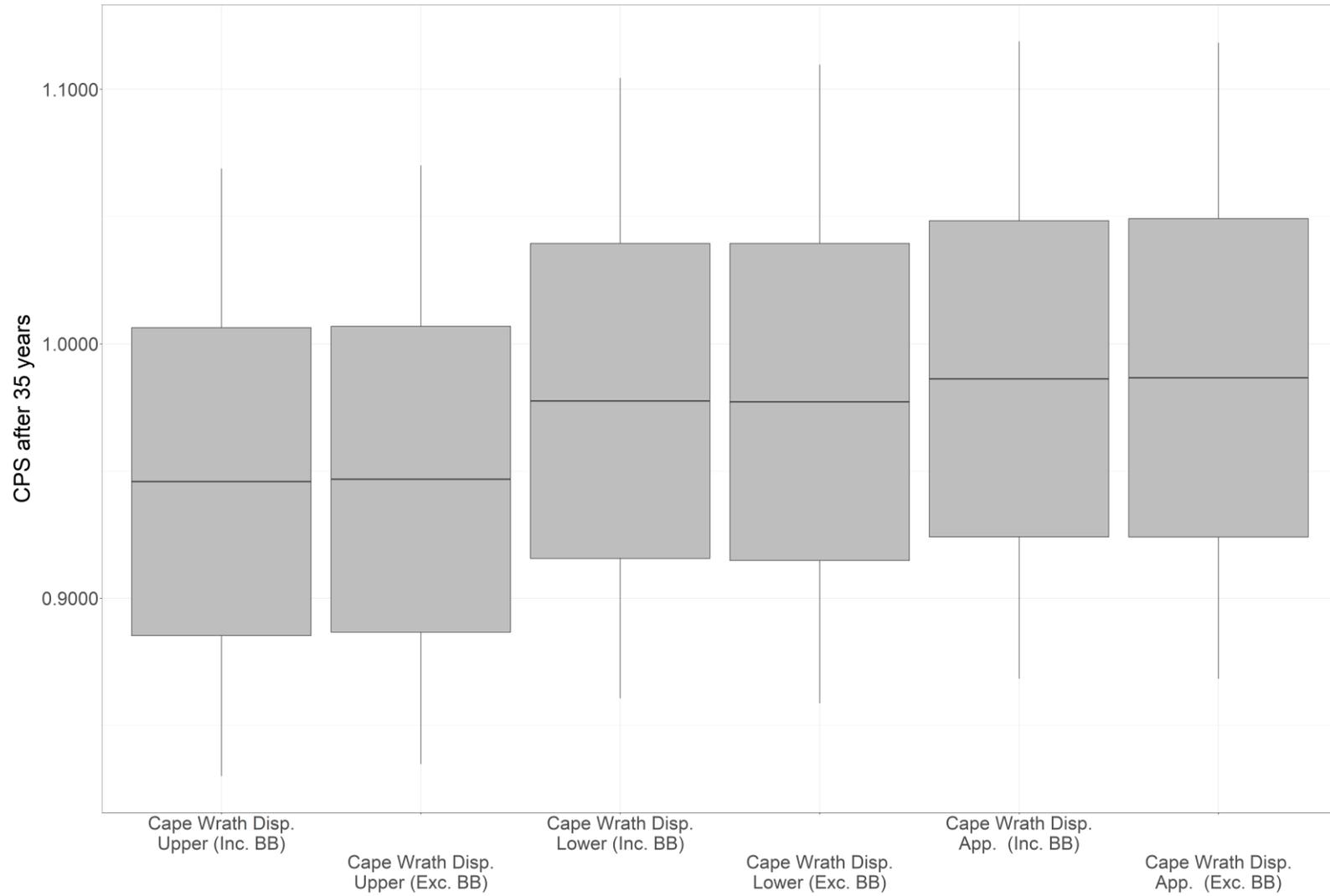


Plate 5-40 Razorbill Population Projection over 35-50 Years at the Flannan Isles SPA

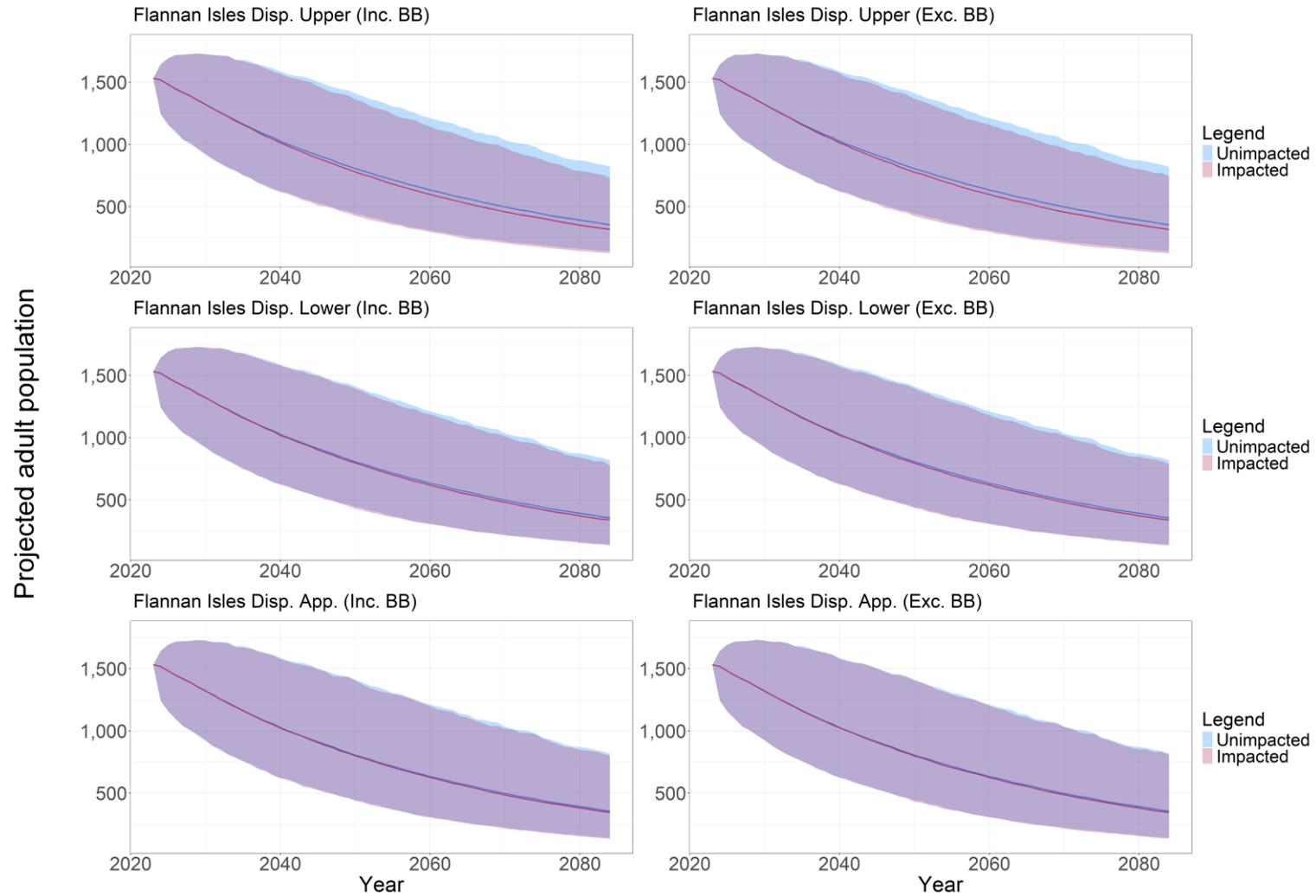


Plate 5-41 CGR after 35 Years for the Razorbill Population at the Flannan Isles SPA.

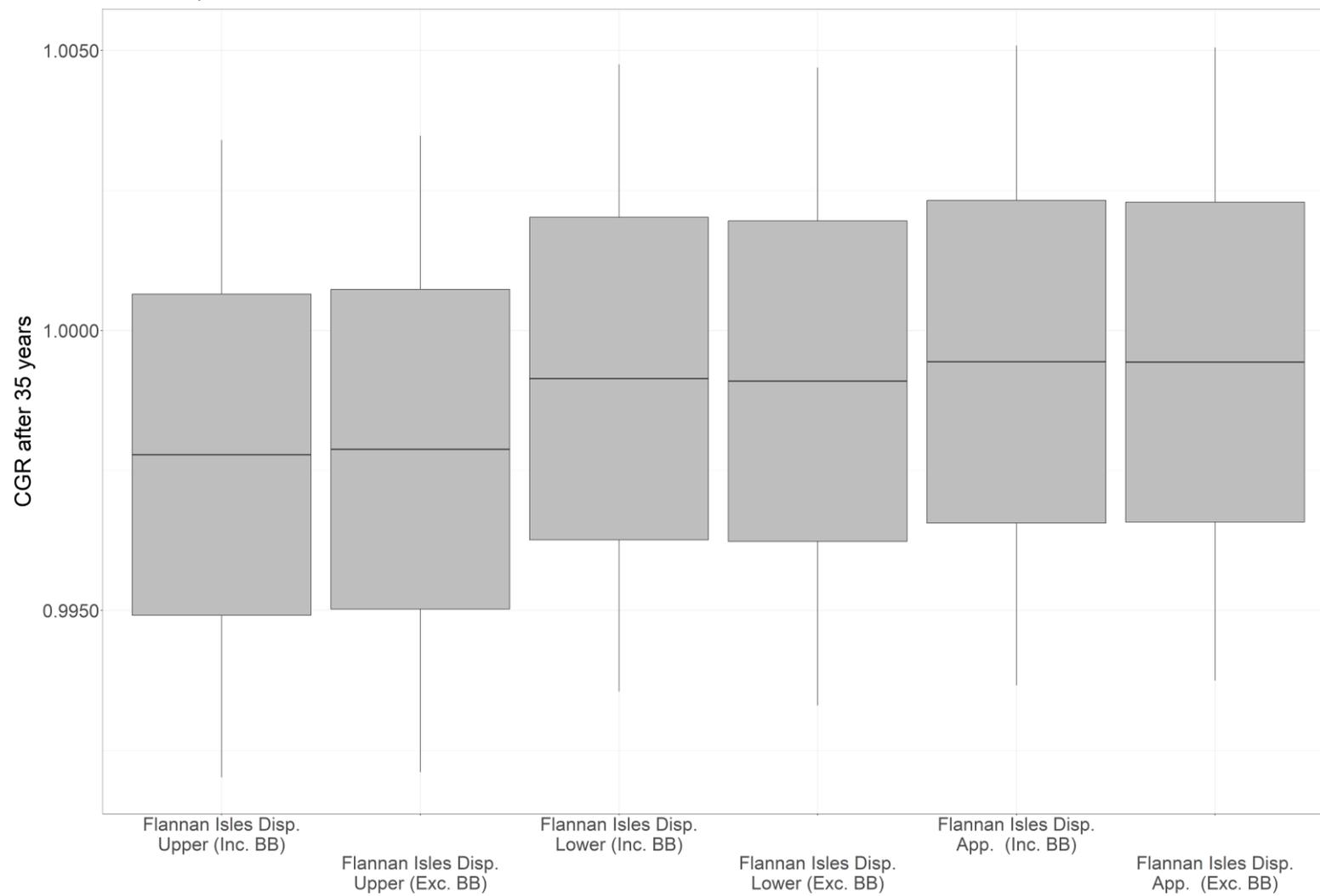


Plate 5-42 CPS after 35 Years for the Razorbill Population at the Flannan Isles SPA.

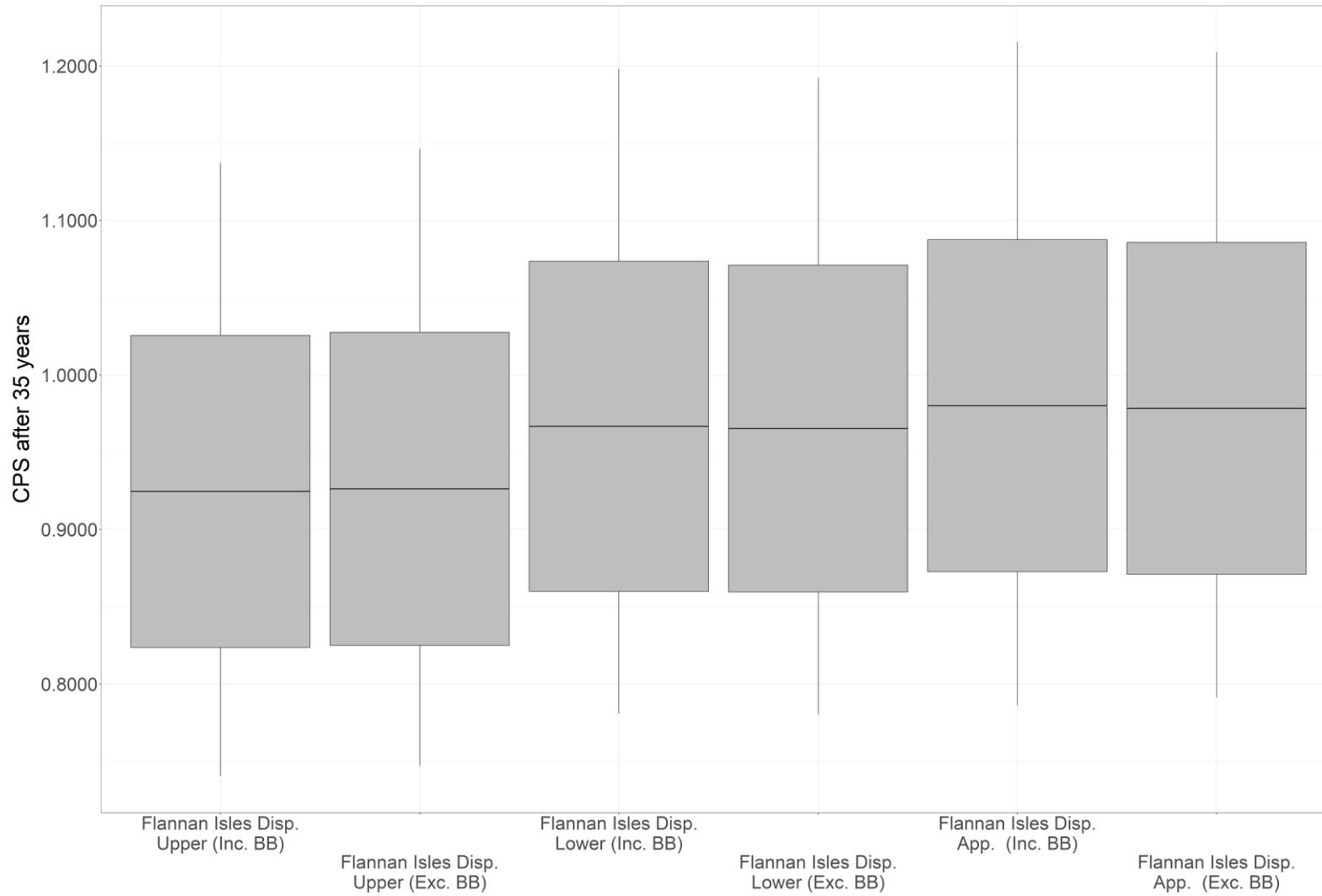


Plate 5-43 Razorbill Population Projection over 35-50 Years at the Handa SPA

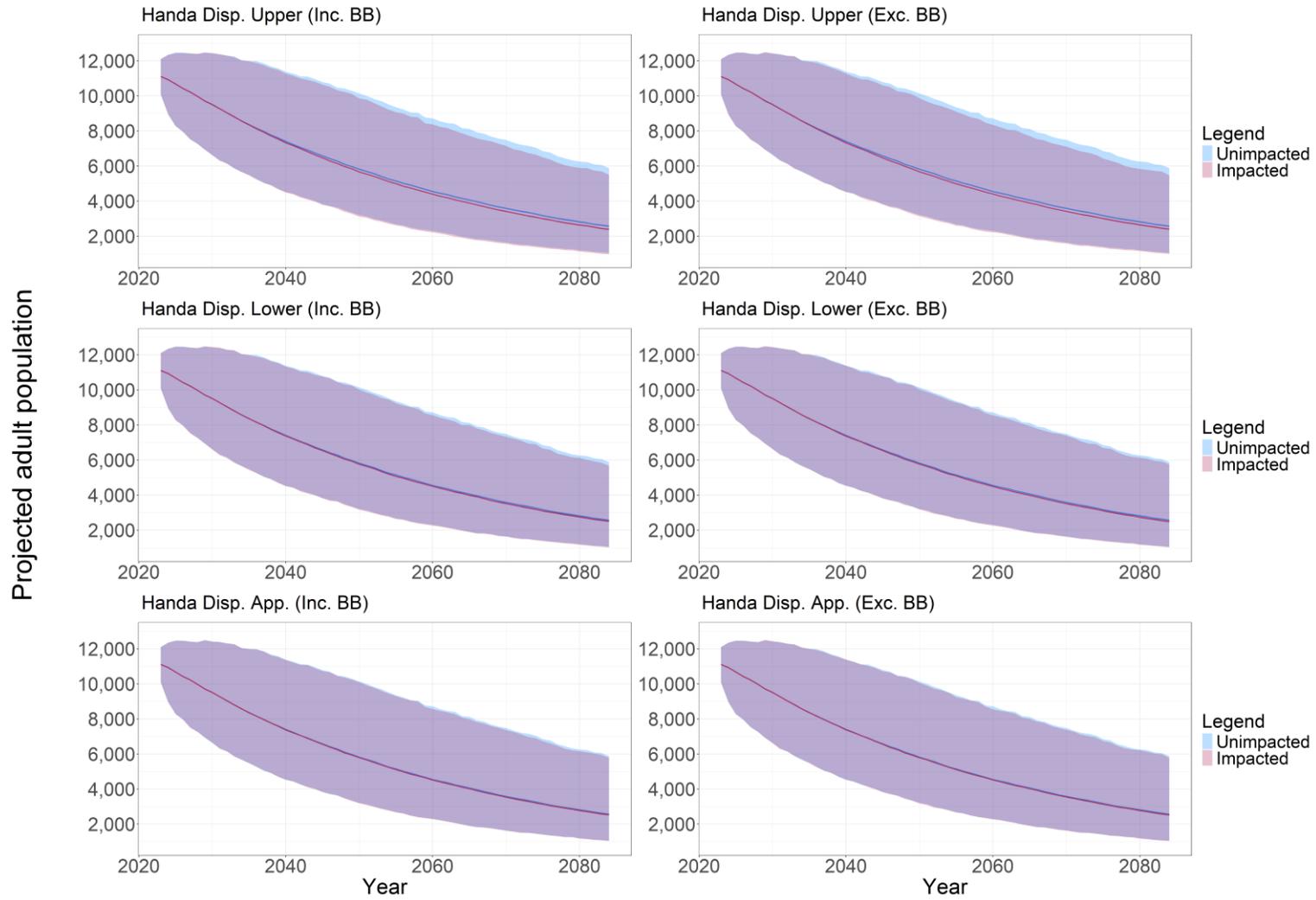


Plate 5-44 CGR after 35 Years for the Razorbill Population at the Handa SPA.

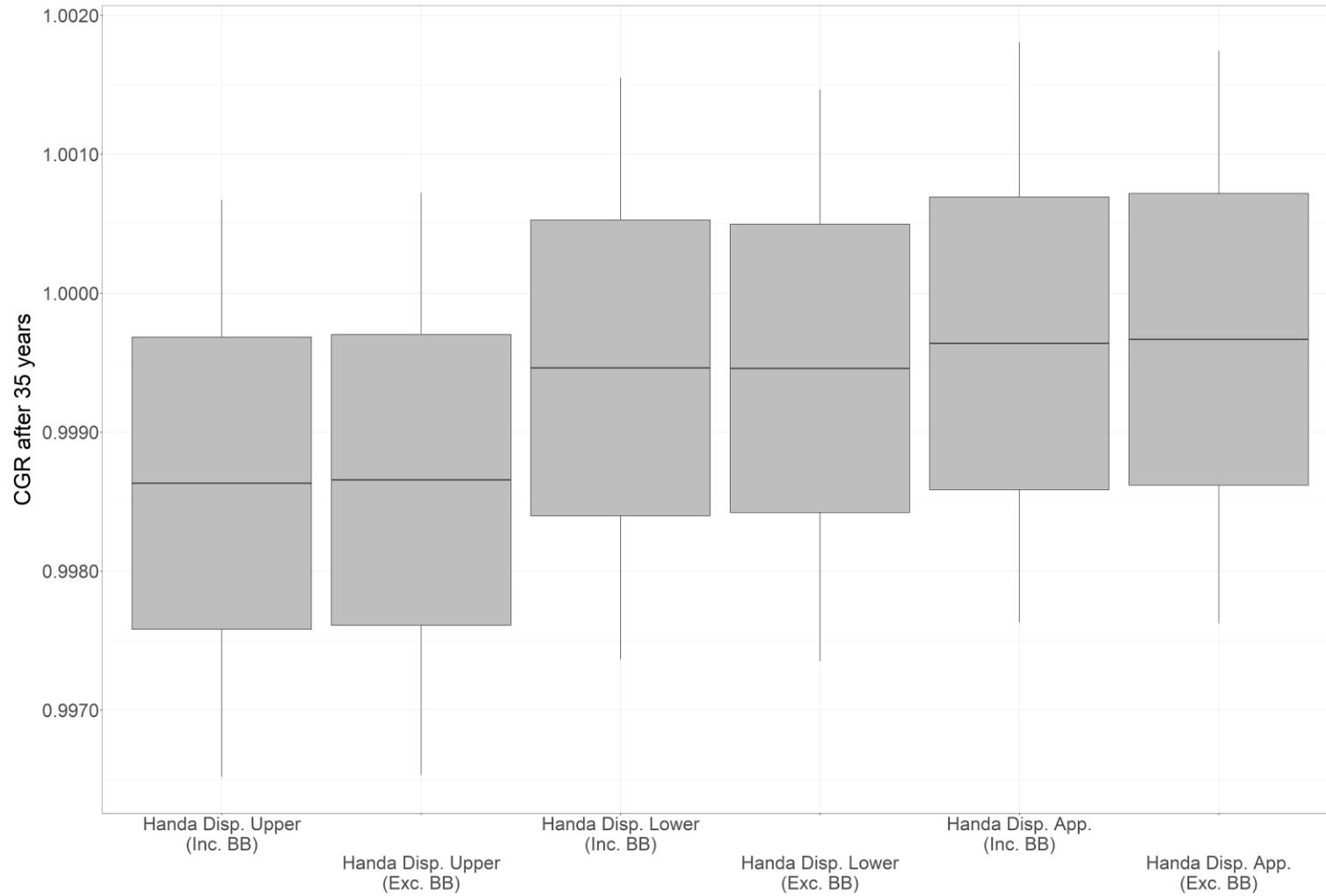


Plate 5-45 CPS after 35 Years for the Razorbill Population at the Handa SPA.

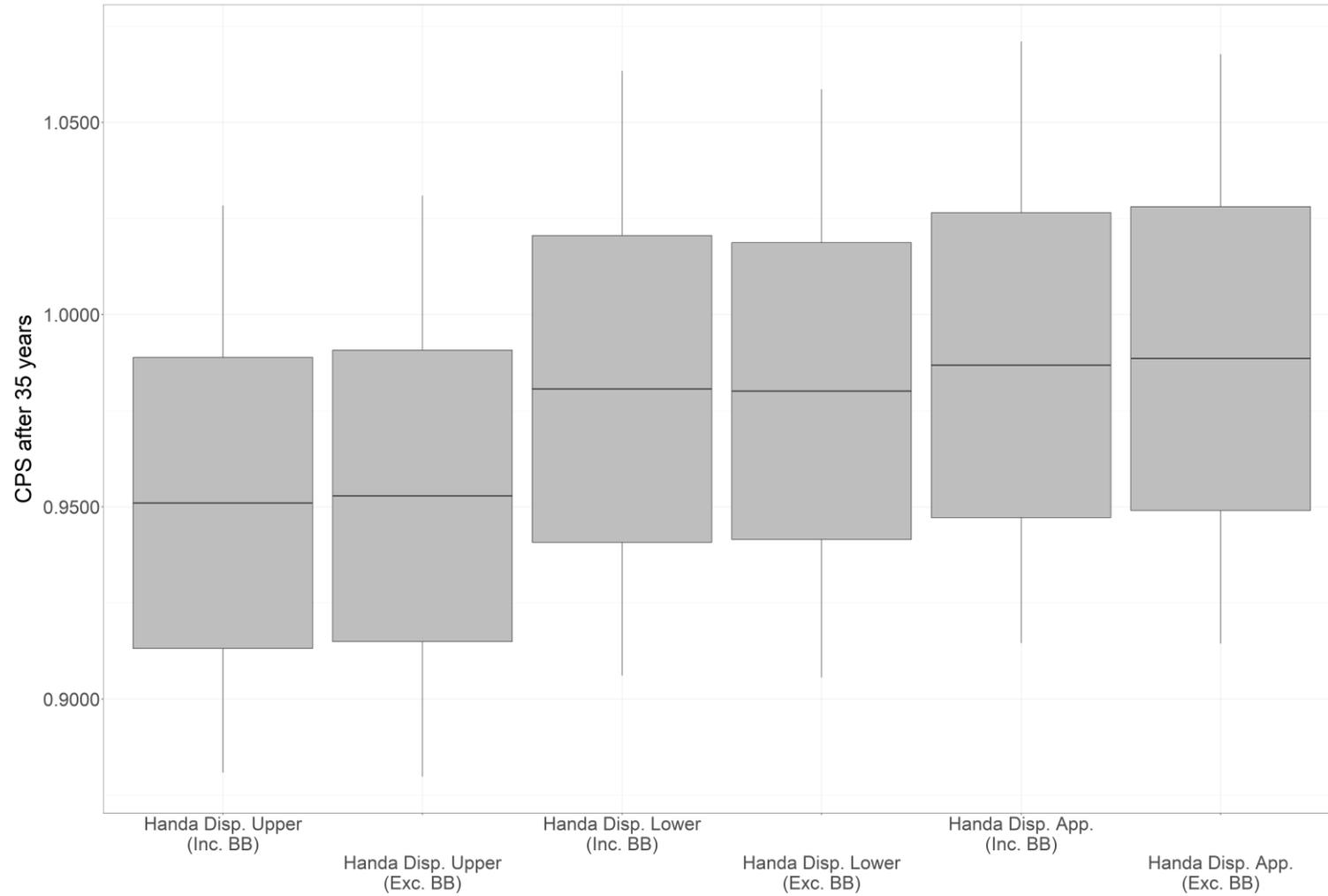


Plate 5-46 Razorbill Population Projection over 35-50 Years at the Mingulay and Berneray SPA.

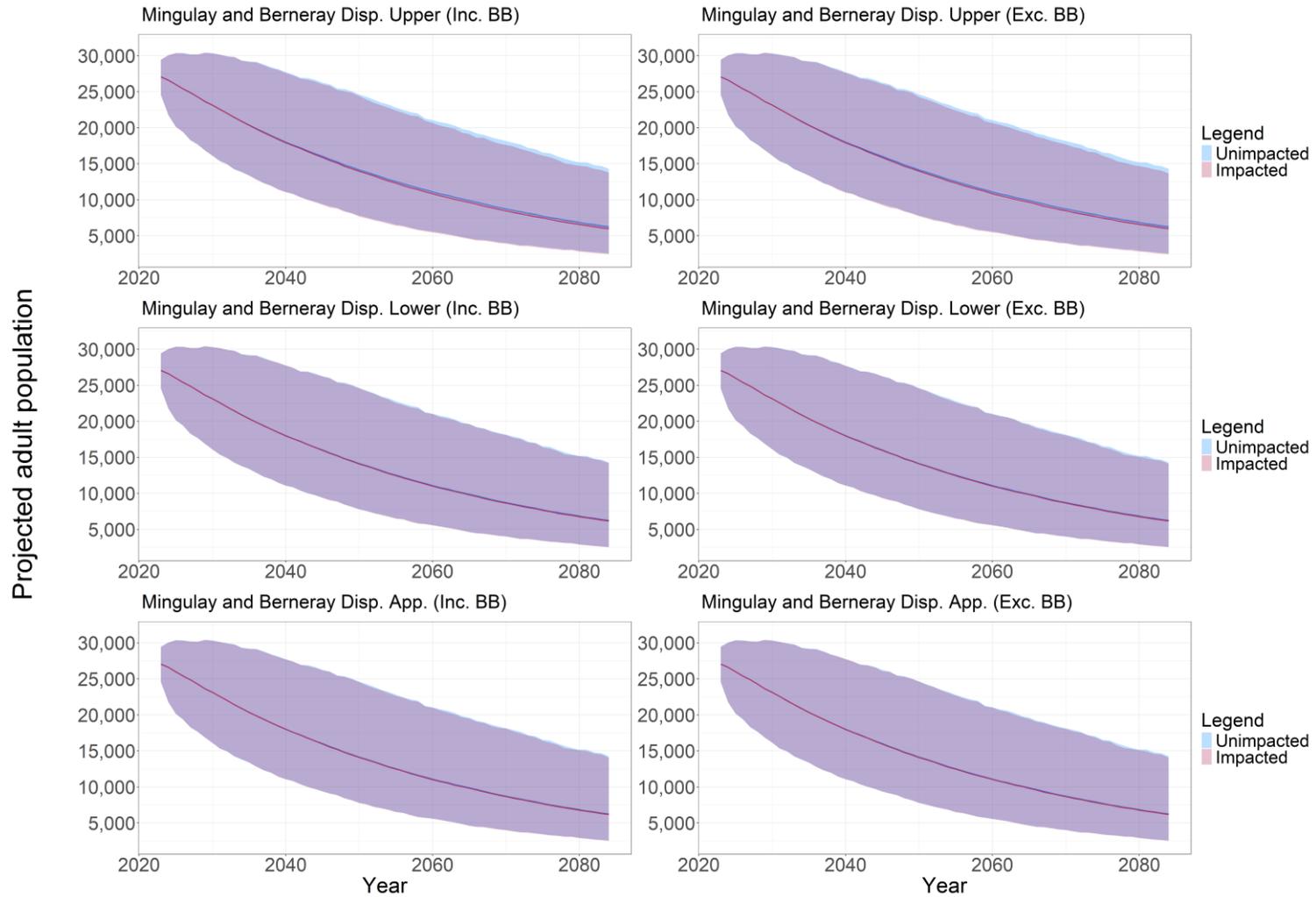


Plate 5-47 CGR after 35 Years for the Razorbill Population at the Handa Mingulay and Berneray SPA.

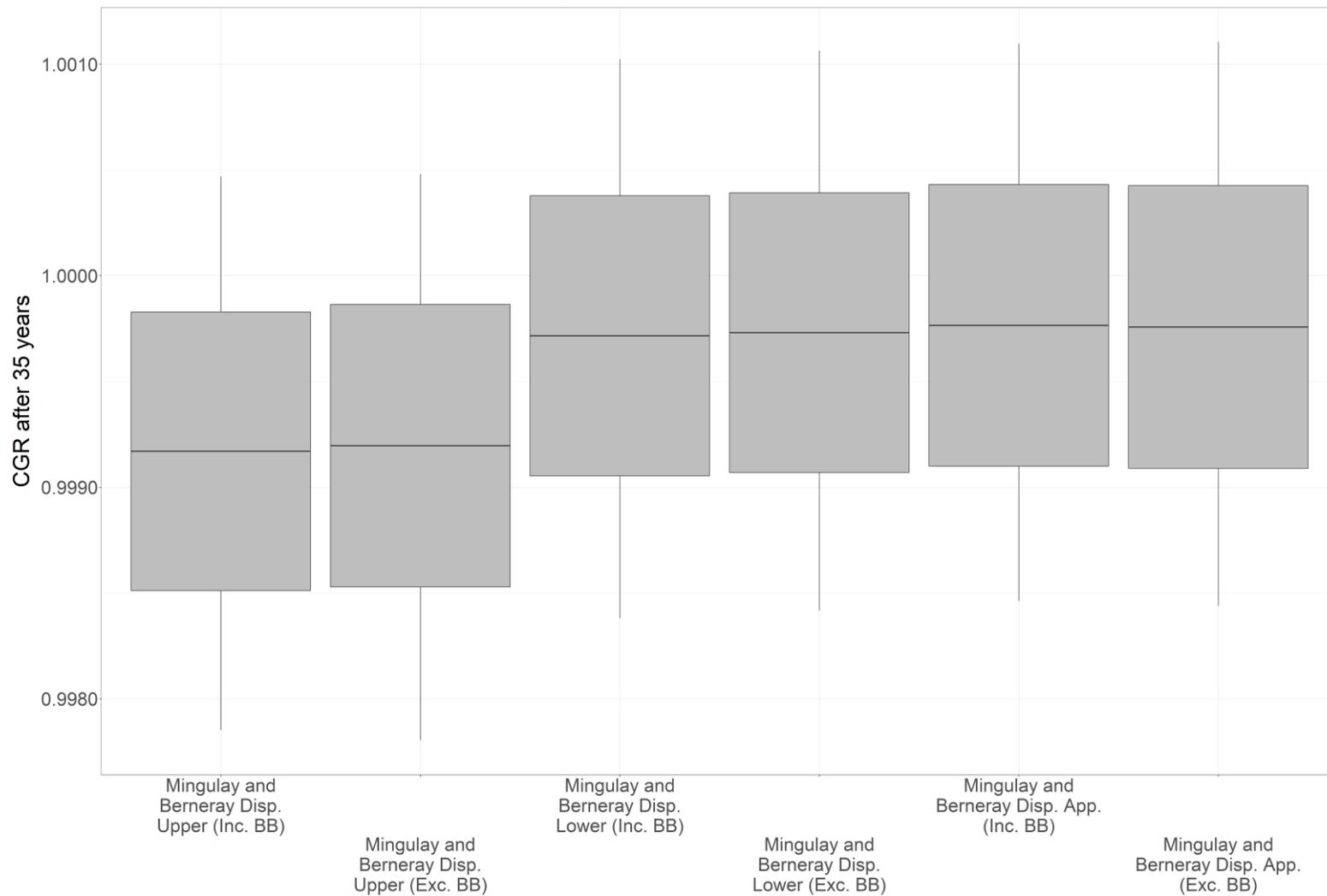


Plate 5-48 CPS after 35 Years for the Razorbill Population at the Handa Mingulay and Berneray SPA.

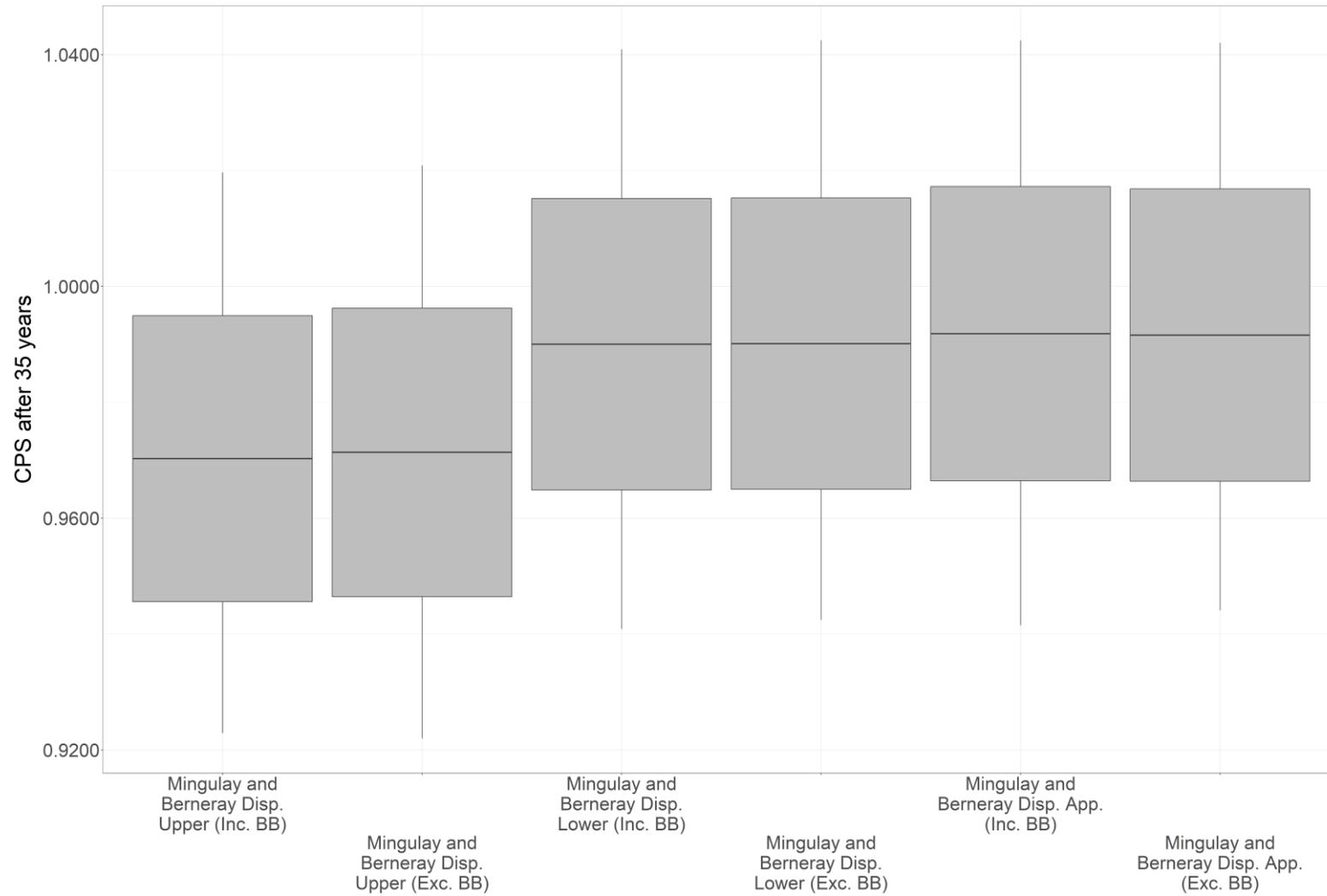


Plate 5-49 Razorbill Population Projection over 35-50 Years at the Rathlin Island SPA.

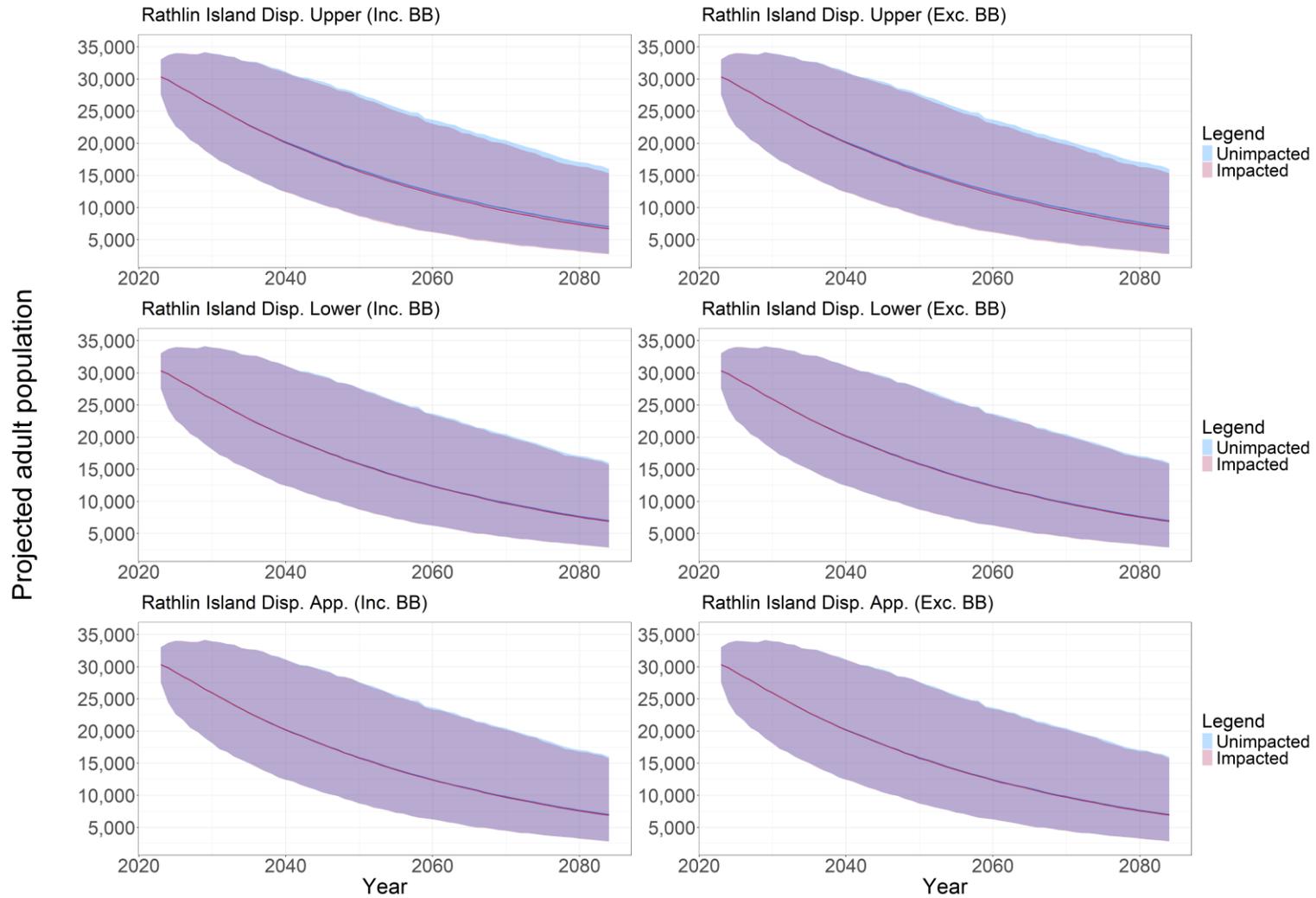


Plate 5-50 CGR after 35 Years for the Razorbill Population at the Rathlin Island SPA.

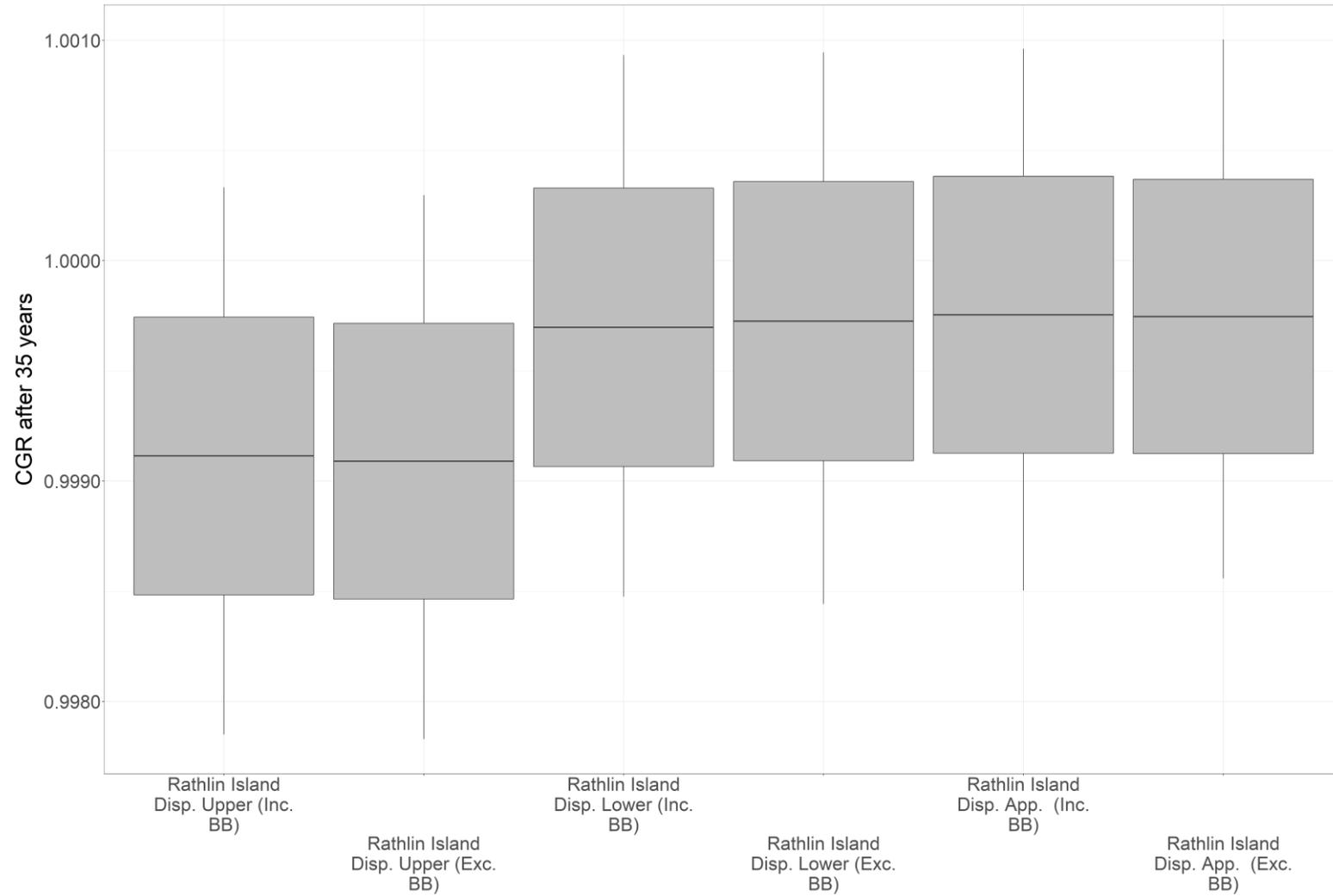


Plate 5-51 CPS after 35 Years for the Razorbill Population at the Rathlin Island SPA.

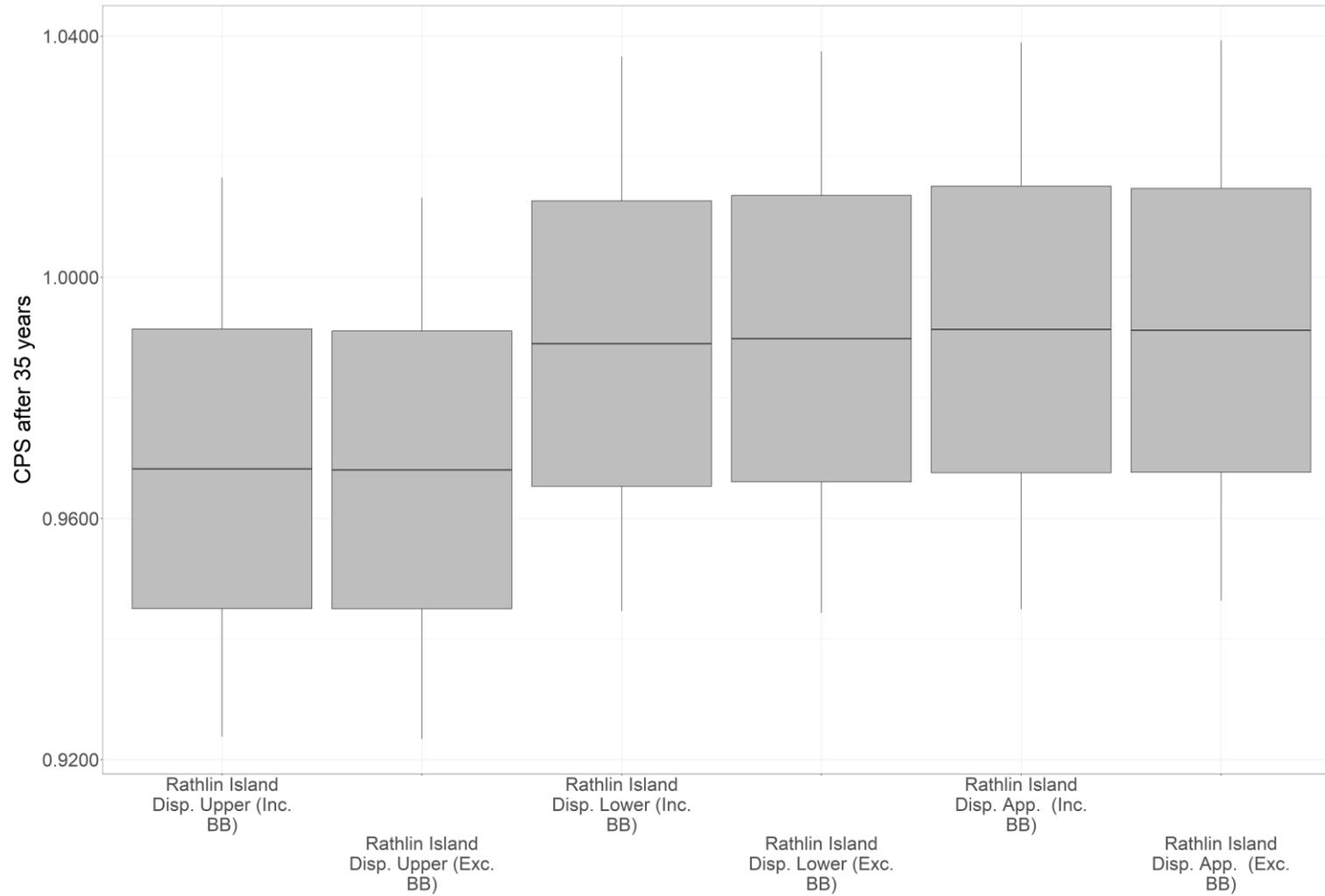


Plate 5-52 Razorbill Population Projection over 35-50 Years at the Shiant Isles SPA.

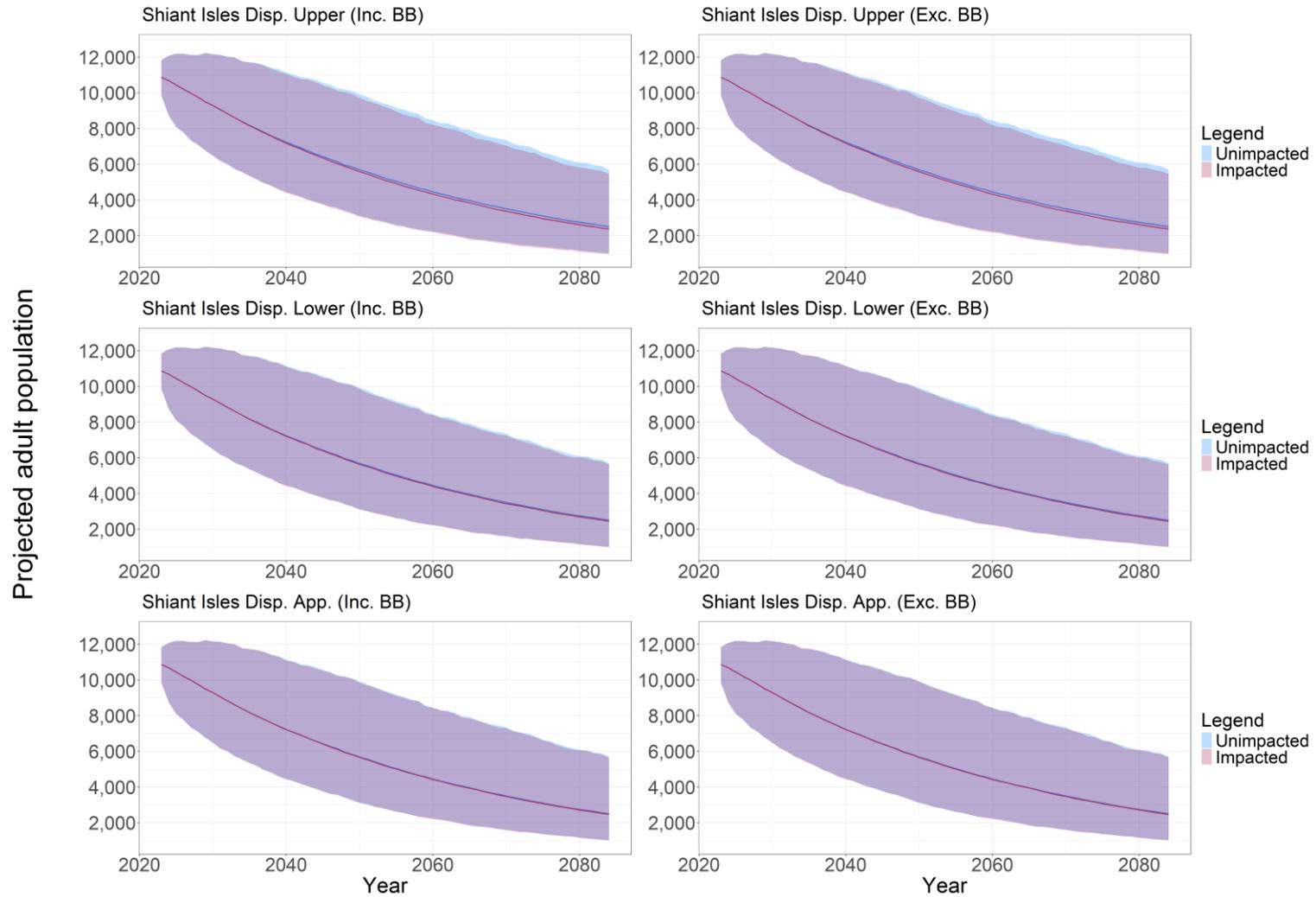


Plate 5-53 CGR after 35 Years for the Razorbill Population at the Shiant Isles SPA.

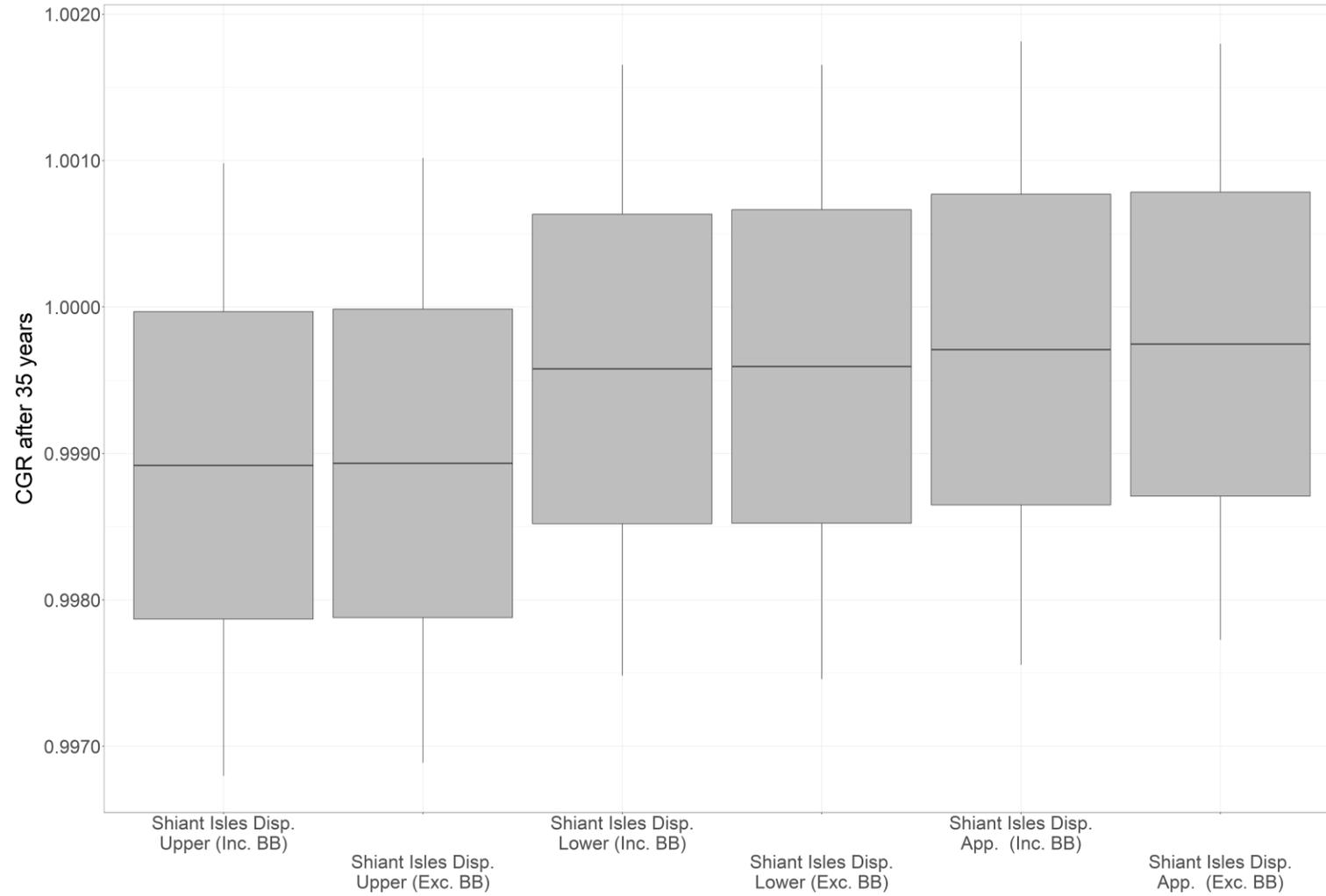


Plate 5-54 CPS after 35 Years for the Razorbill Population at the Shiant Isles SPA.

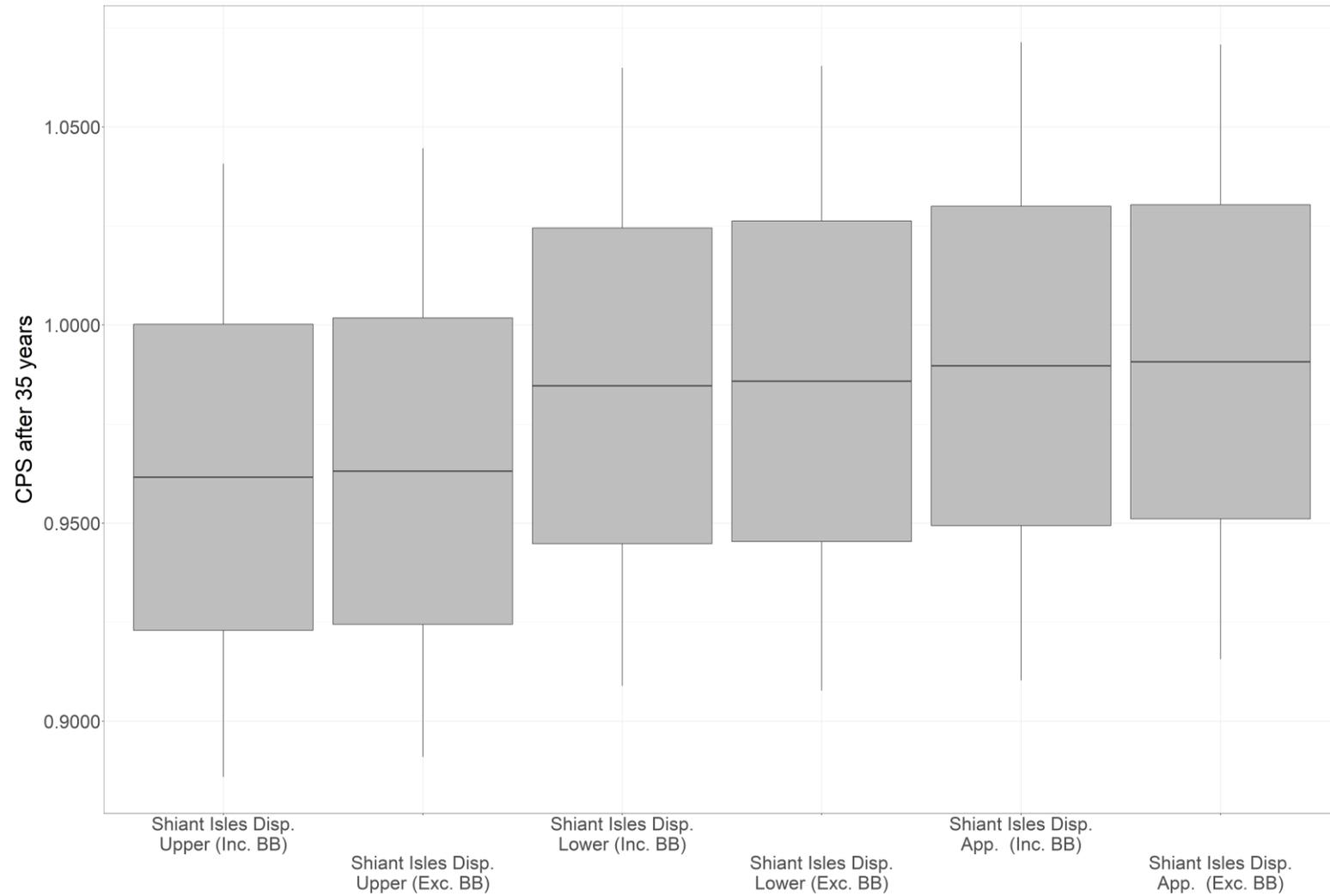


Plate 5-55 Razorbill Population Projection over 35-50 Years at the Skomer, Skokholm and the Seas off Pembrokeshire SPA.

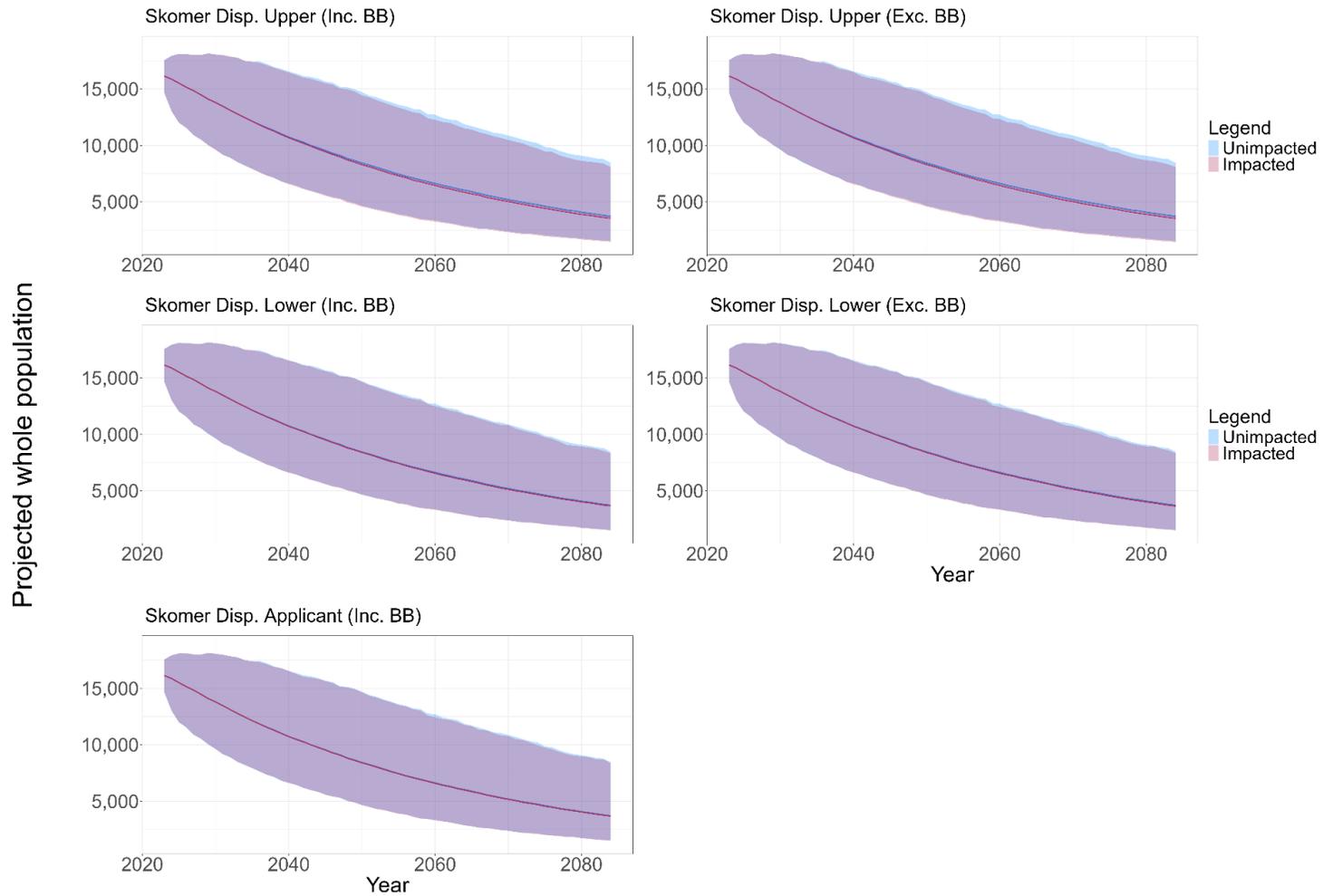


Plate 5-56 CGR after 35 Years for the Razorbill Population at the Skomer, Skokholm and the Seas off Pembrokeshire SPA.

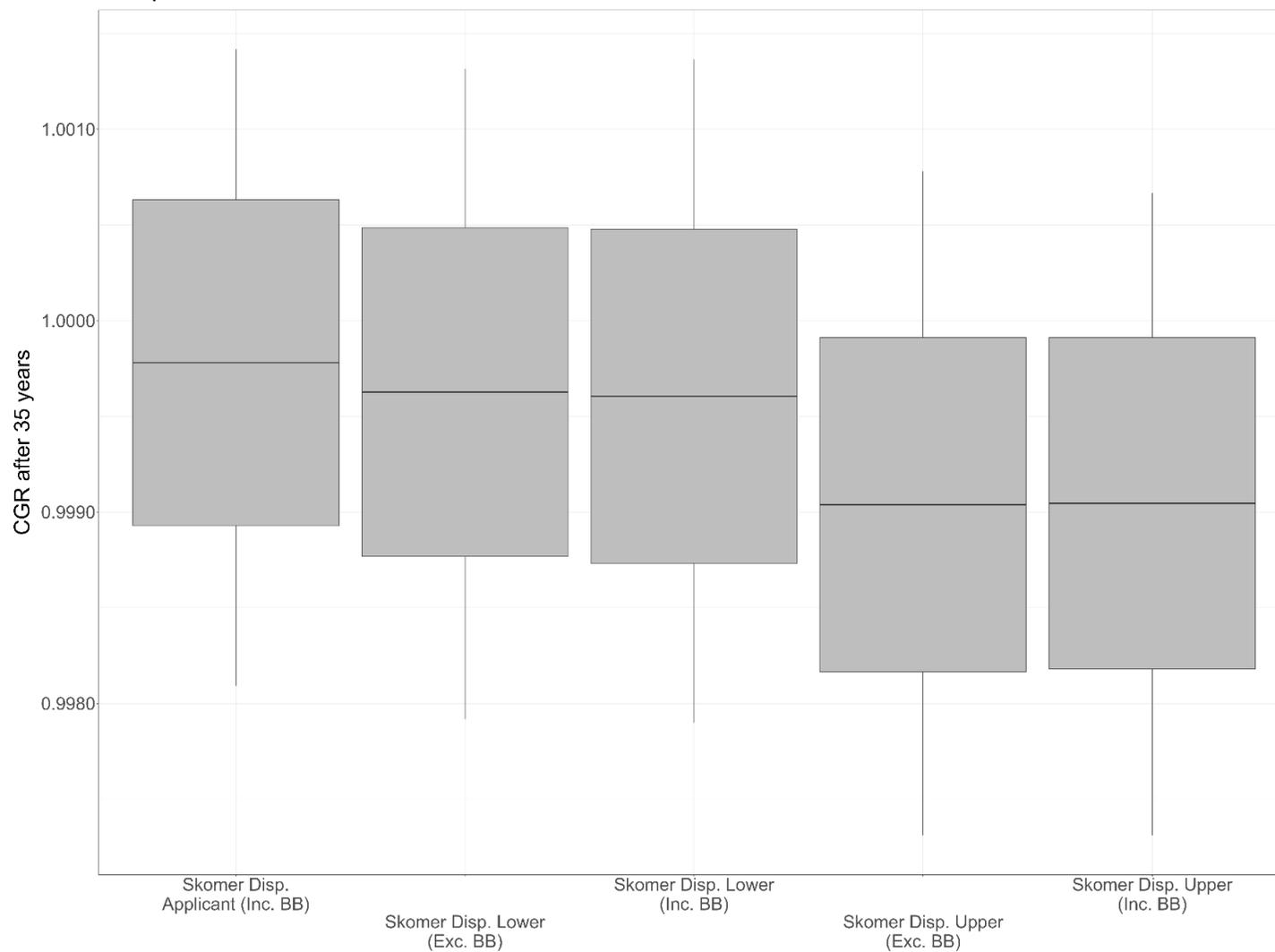


Plate 5-57 CPS after 35 Years for the Razorbill Population at the Skomer, Skokholm and the Seas off Pembrokeshire SPA.

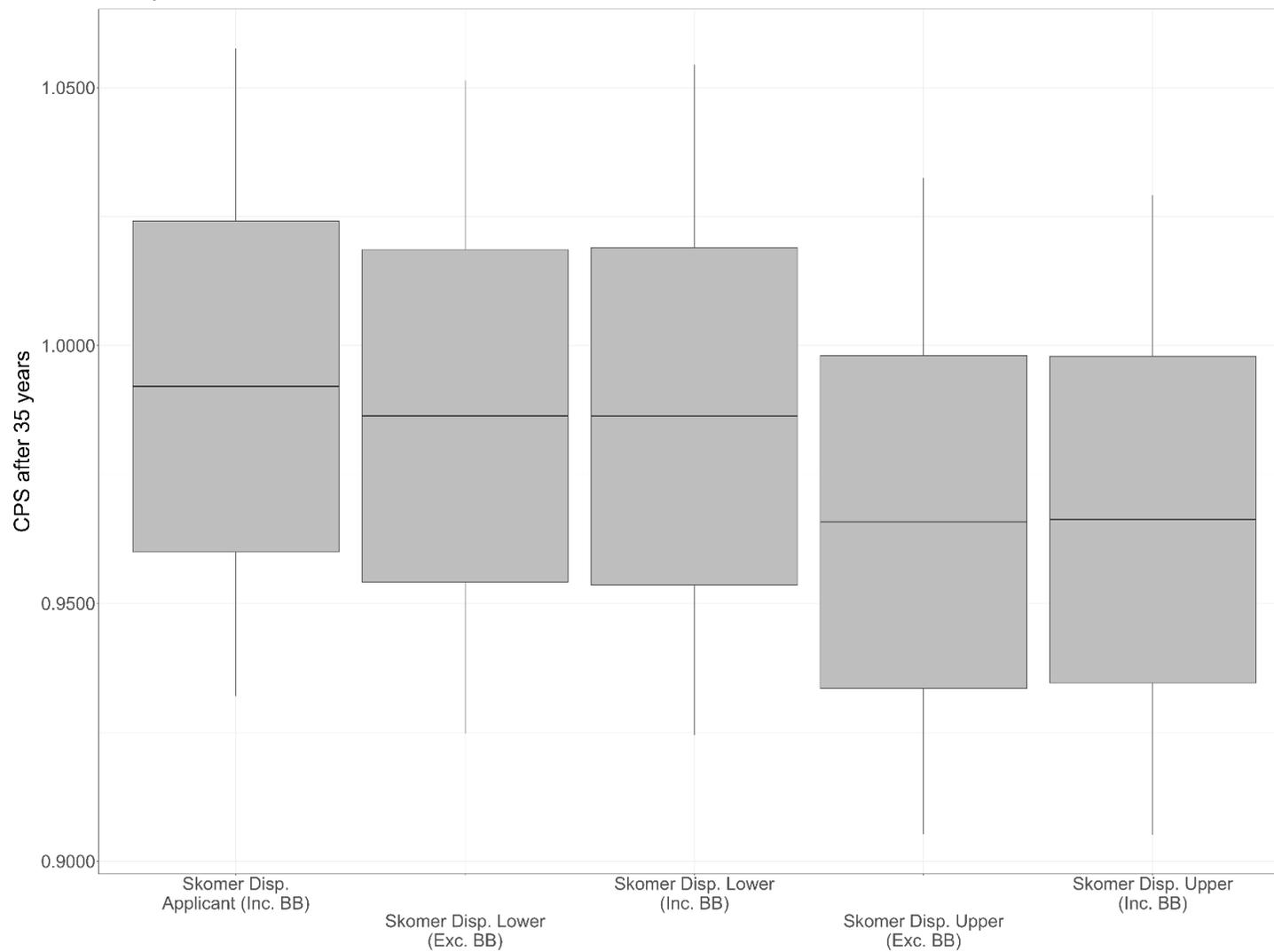


Plate 5-58 Razorbill Population Projection over 35-50 Years at the St Kilda SPA.

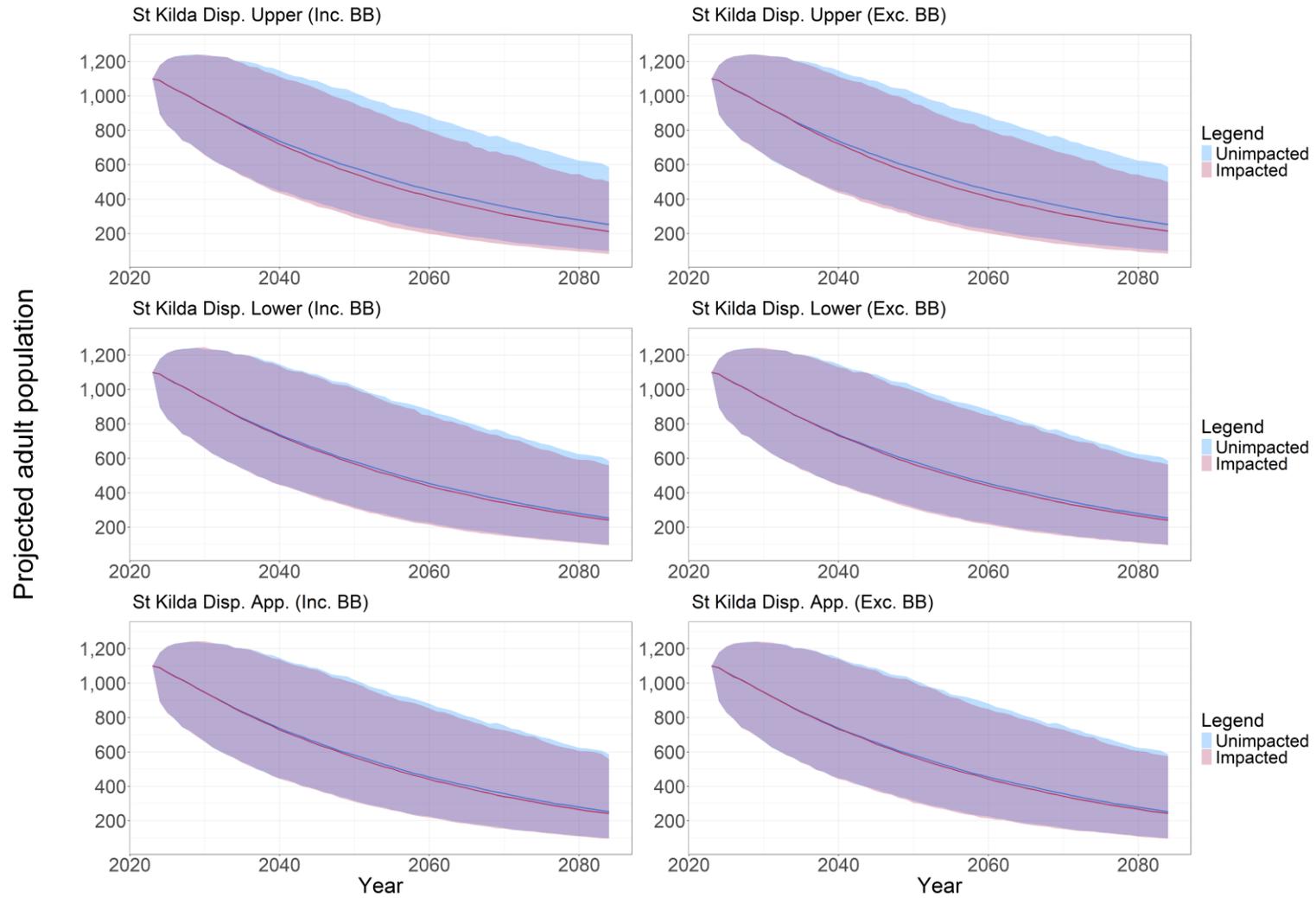


Plate 5-59 CGR after 35 Years for the Razorbill Population at the St Kilda SPA.

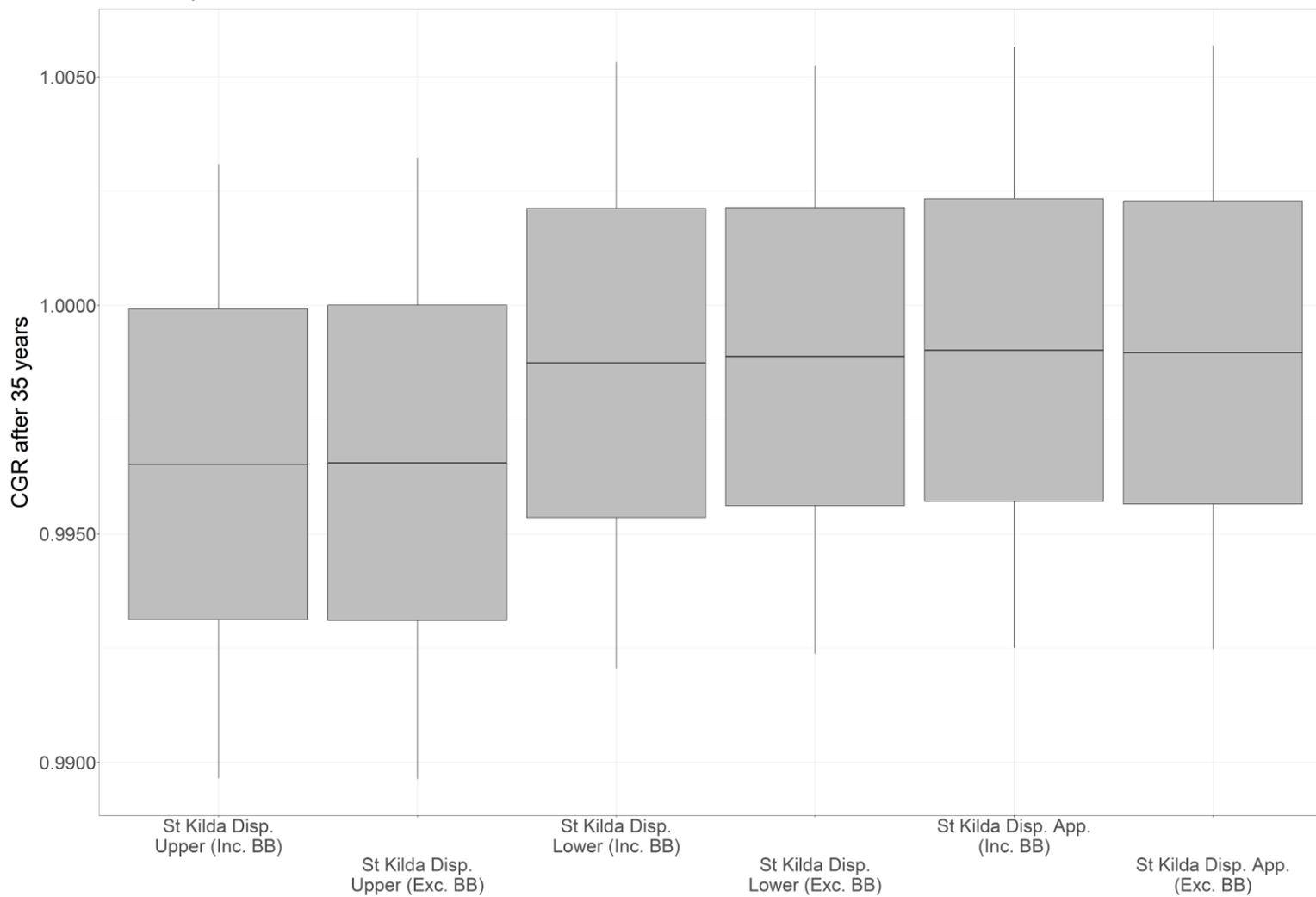
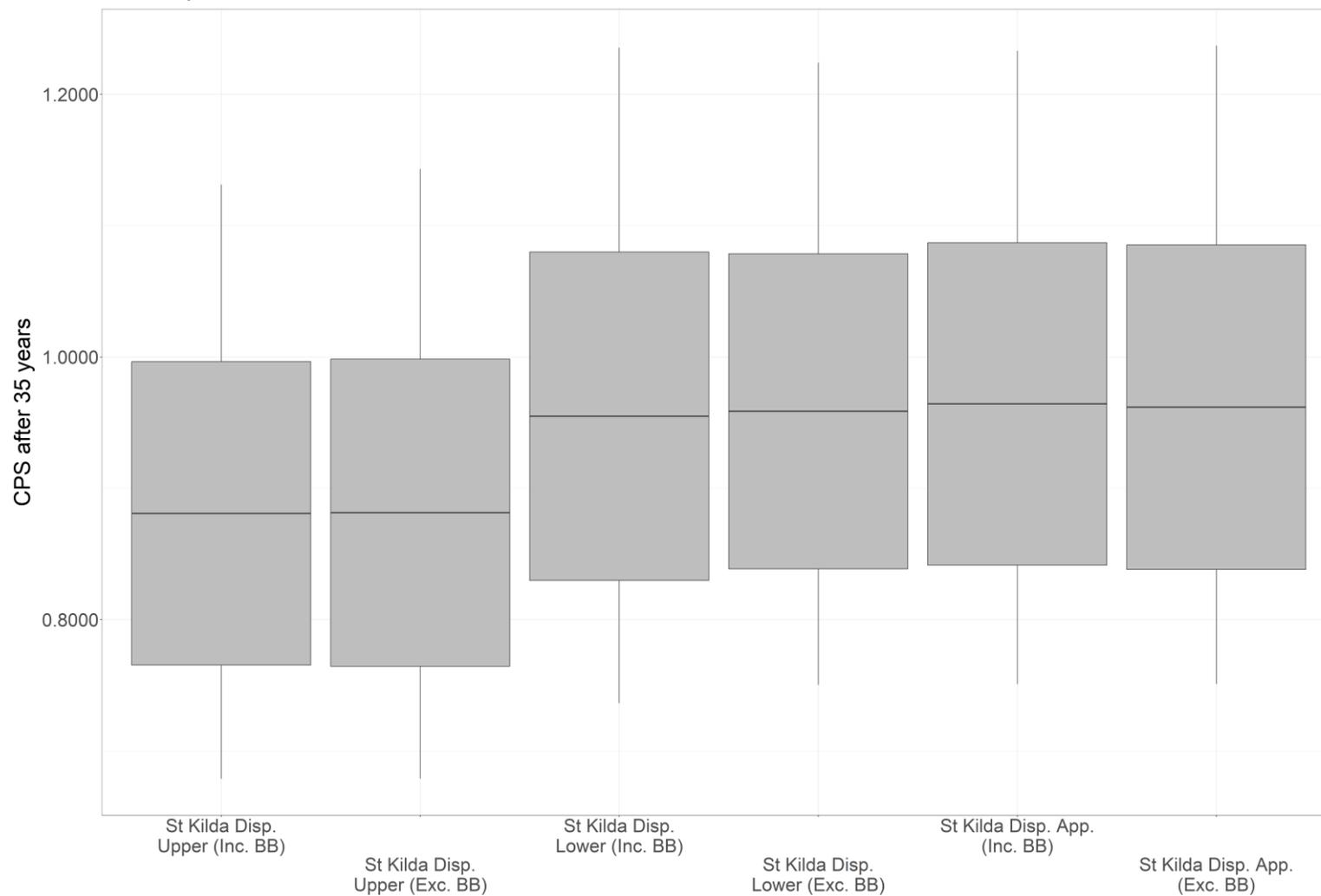


Plate 5-60 CPS after 35 Years for the Razorbill Population at the St Kilda SPA.





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5.2.4 PUFFIN

5.2.4.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the puffin populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 5-4**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 5-61** to **Plate 5-75**.

Table 5-4 Offshore Project In-combination PVA Outputs for Puffin After 35 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|----------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 3.46 | 0.9712 | 0.9991 | 0.9683 | 0.09 | 3.17 | 47.30 | 52.34 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 3.46 | 0.9711 | 0.9991 | 0.9670 | 0.09 | 3.30 | 47.26 | 52.56 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 2.04 | 0.9715 | 0.9995 | 0.9805 | 0.05 | 1.95 | 48.12 | 51.70 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 2.04 | 0.9715 | 0.9995 | 0.9799 | 0.05 | 2.01 | 48.50 | 51.34 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Flannan Isles SPA | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 38.37 | 0.9716 | 0.9995 | 0.9833 | 0.05 | 1.67 | 48.56 | 51.28 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 38.35 | 0.9716 | 0.9995 | 0.9836 | 0.05 | 1.64 | 48.52 | 51.40 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 22.69 | 0.9718 | 0.9997 | 0.9900 | 0.03 | 1.00 | 49.22 | 50.84 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 22.68 | 0.9717 | 0.9997 | 0.9901 | 0.03 | 0.99 | 49.10 | 50.68 |
| | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Shiant Isles SPA | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 35.86 | 0.9717 | 0.9997 | 0.9884 | 0.03 | 1.16 | 49.04 | 50.78 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 35.77 | 0.9717 | 0.9997 | 0.9884 | 0.03 | 1.16 | 48.96 | 50.92 |
| St Kilda SPA | Baseline | 0 | 0.9721 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 50.87 | 0.9717 | 0.9997 | 0.9893 | 0.03 | 1.07 | 49.12 | 50.78 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 50.67 | 0.9717 | 0.9997 | 0.9892 | 0.03 | 1.08 | 48.86 | 50.82 |
| | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|--------------------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Sule Skerry and Sule Stack SPA | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 109.83 | 0.9708 | 0.9987 | 0.9530 | 0.13 | 4.70 | 46.24 | 54.06 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 109.75 | 0.9707 | 0.9986 | 0.9524 | 0.14 | 4.76 | 46.10 | 54.24 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 64.63 | 0.9712 | 0.9992 | 0.9716 | 0.08 | 2.84 | 47.52 | 52.52 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 64.61 | 0.9712 | 0.9992 | 0.9717 | 0.08 | 2.83 | 47.46 | 52.54 |

5.2.4.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Displacement NatureScot Upper (60/5/3) is presented as 'Disp. Upper';
- Displacement NatureScot Lower (60/3/1) is presented as 'Disp. Lower';
- The scenarios with Berwick Bank are presented as '(Inc. BB)';
- The scenarios without Berwick Bank are presented as '(Exc. BB).

Plate 5-61 Puffin Population Projection over 35-50 Years at the Cape Wrath SPA.

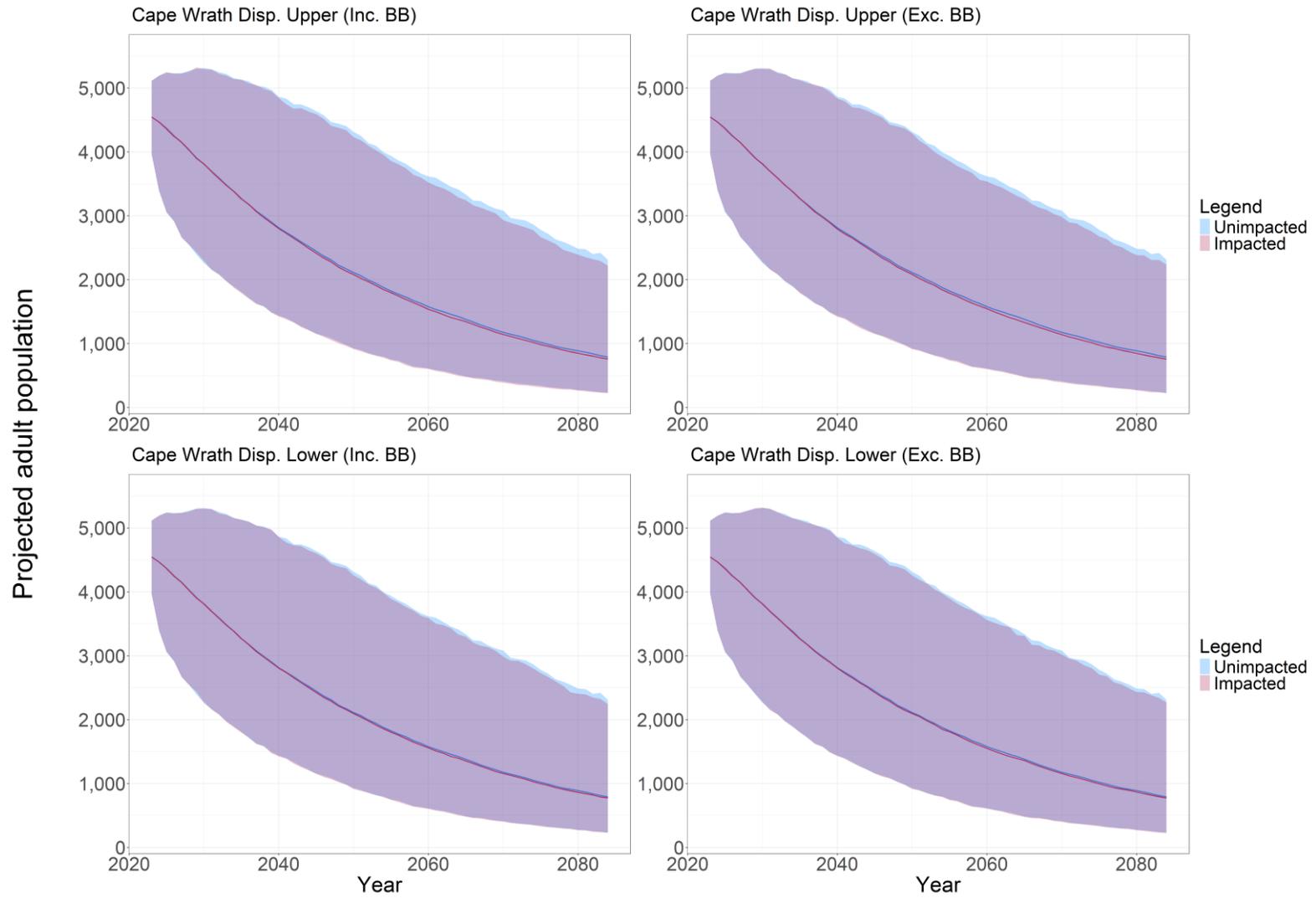


Plate 5-62 CGR after 35 Years for the Puffin Population at the Cape Wrath SPA.

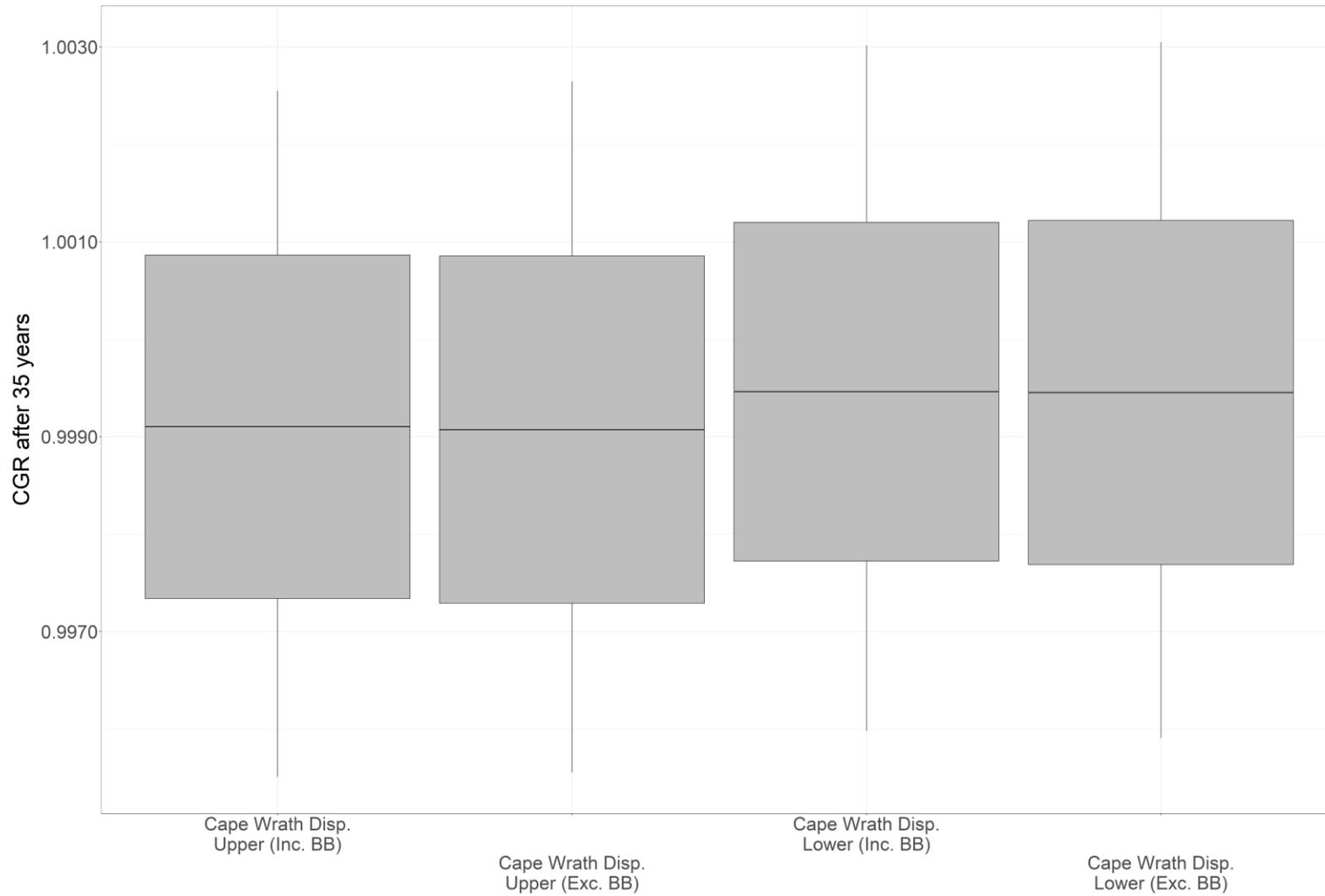


Plate 5-63 CPS after 35 Years for the Puffin Population at the Cape Wrath SPA.

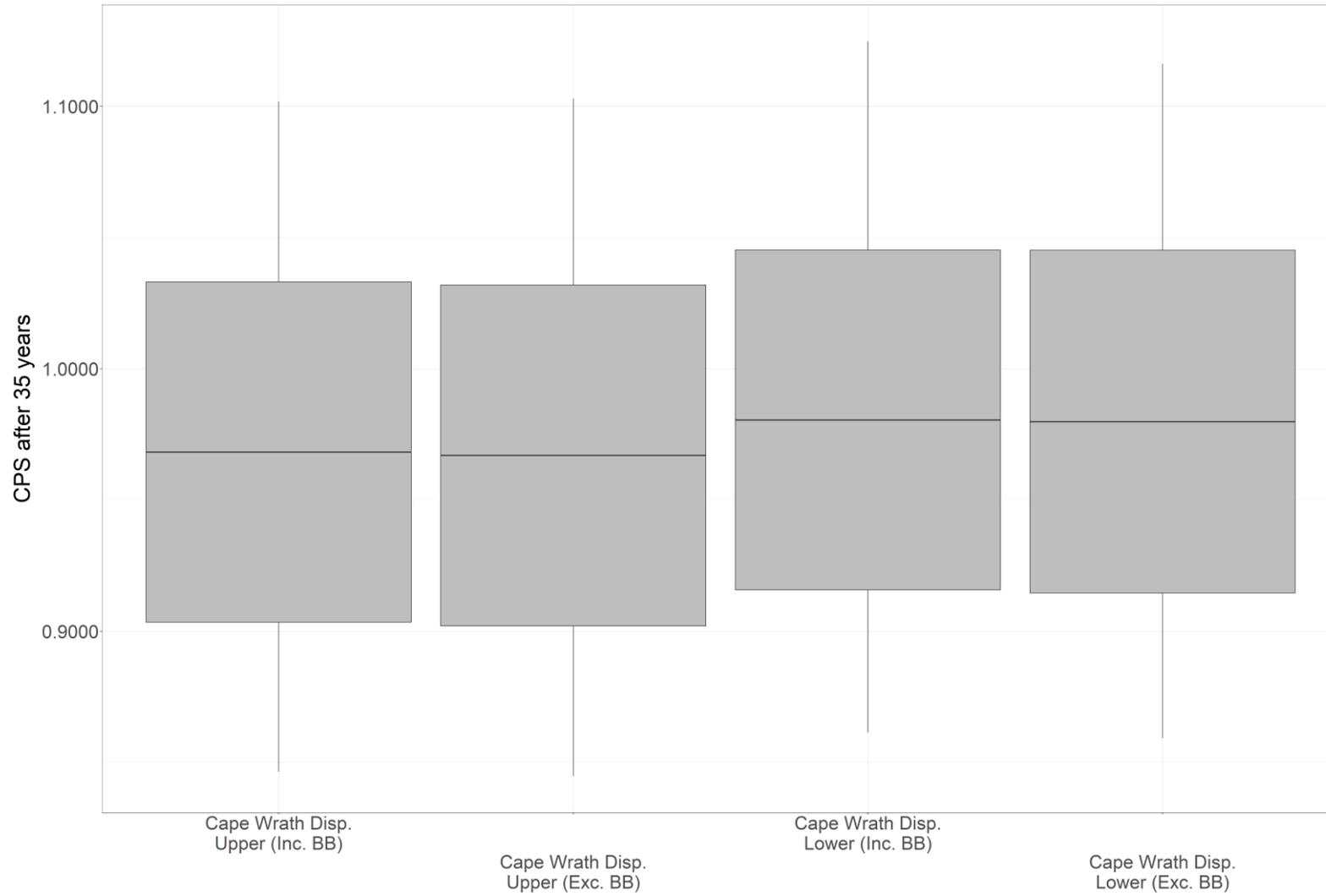


Plate 5-64 Puffin Population Projection over 35-50 Years at the Flannan Isles SPA.

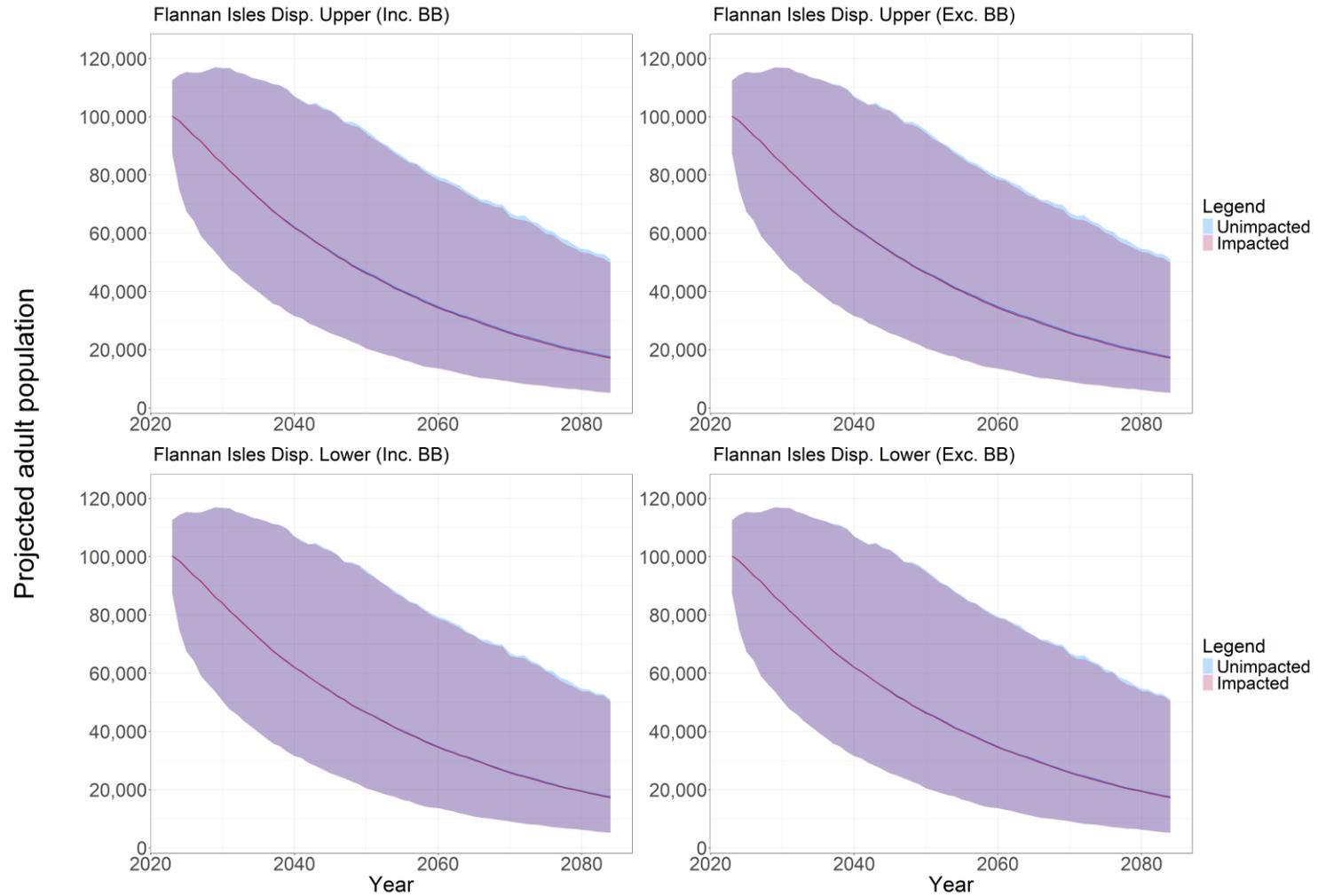


Plate 5-65 CGR after 35 Years for the Puffin Population at the Flannan Isles SPA.

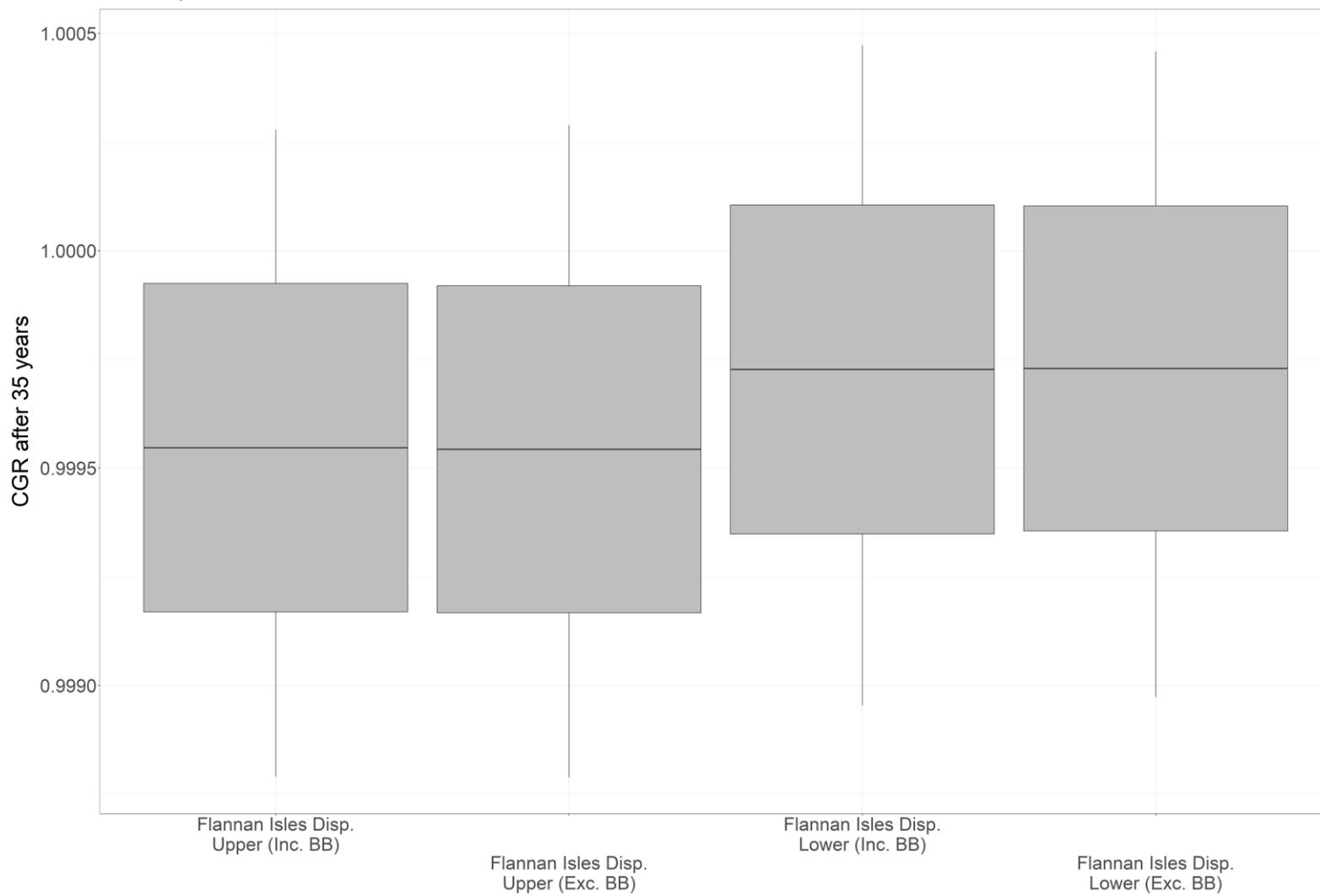


Plate 5-66 CPS after 35 Years for the Puffin Population at the Flannan Isles SPA.

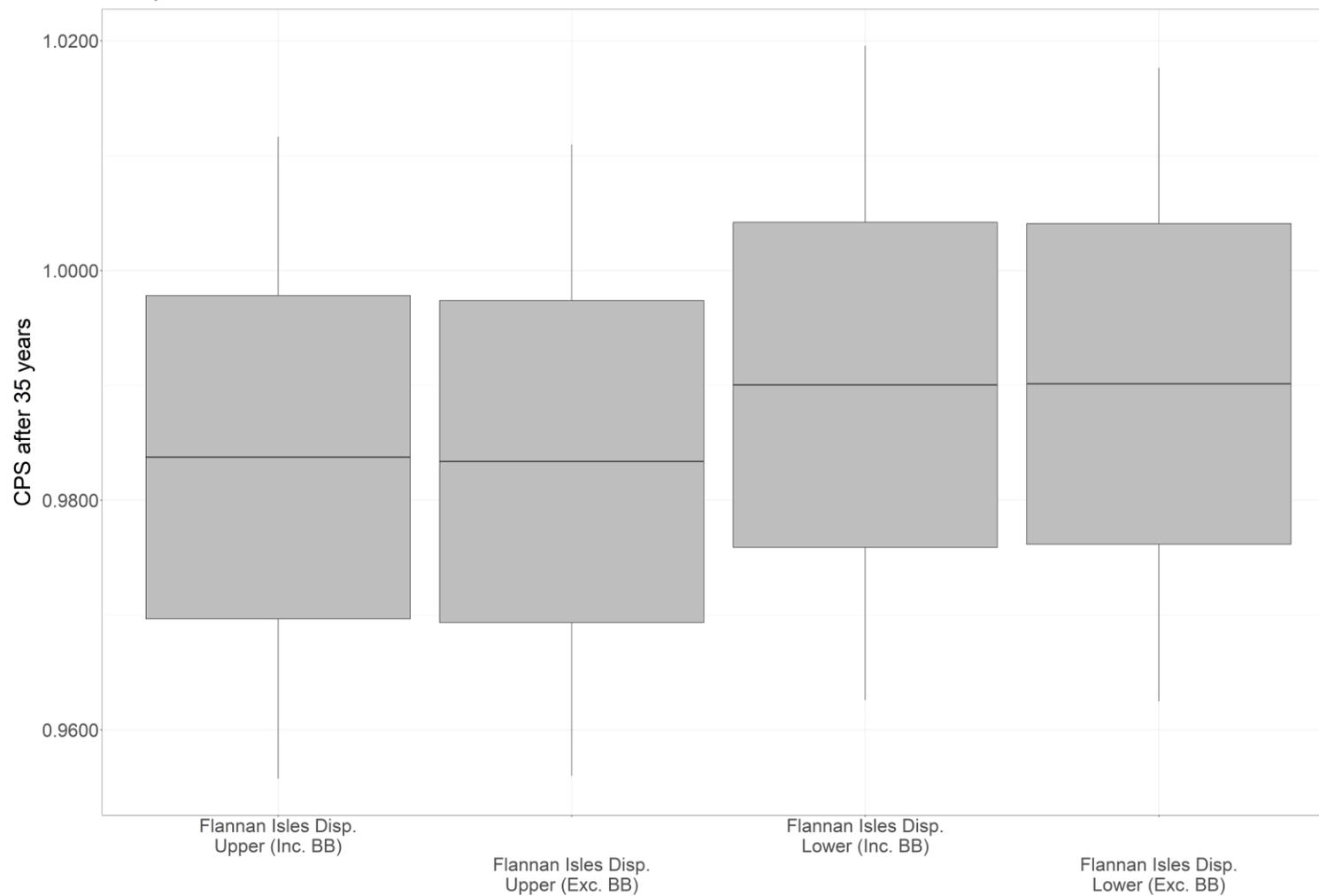


Plate 5-67 Puffin Population Projection over 35-50 Years at the Shiant Isles SPA.

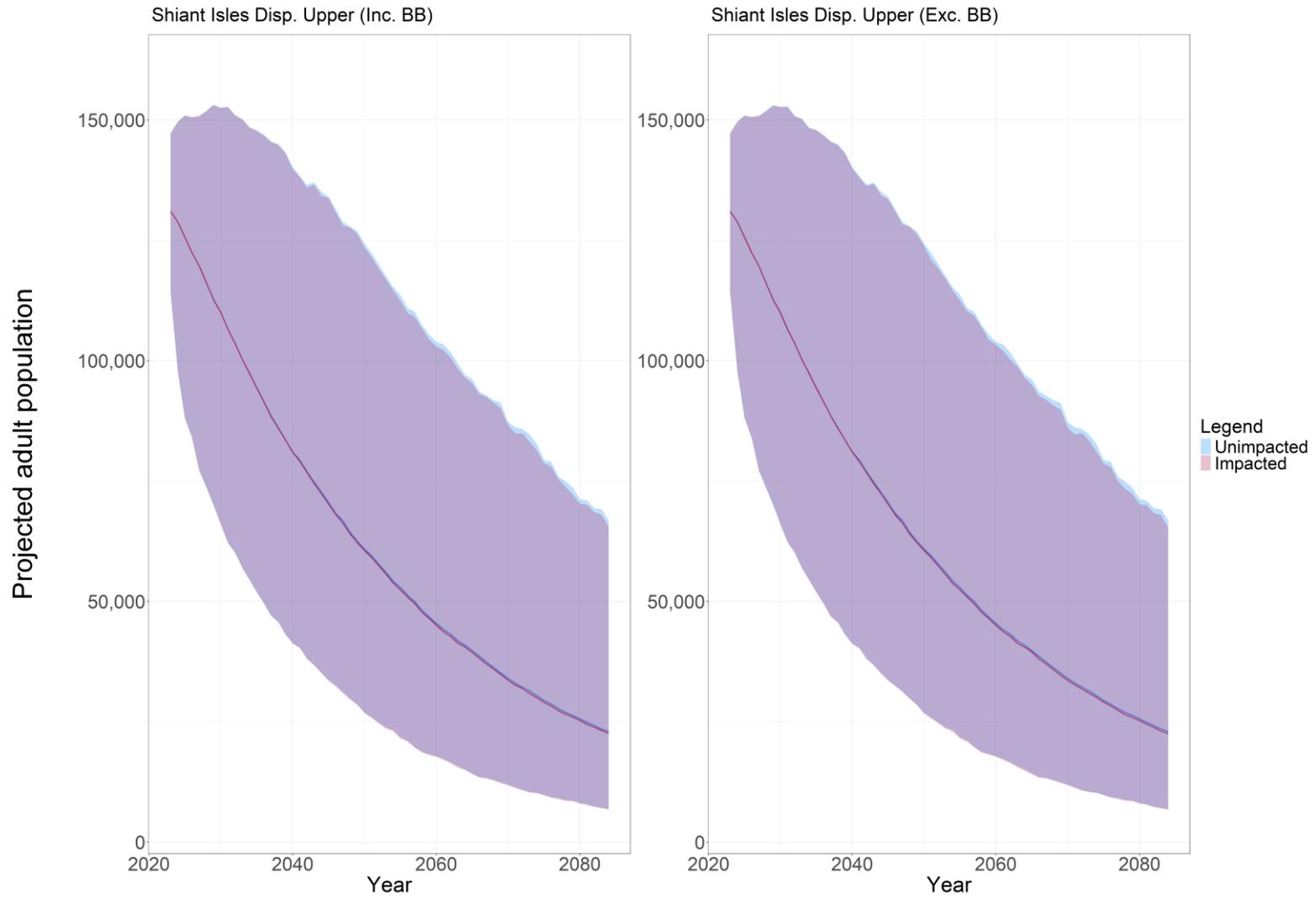


Plate 5-68 CGR after 35 Years for the Puffin Population at the Shiant Isles SPA.

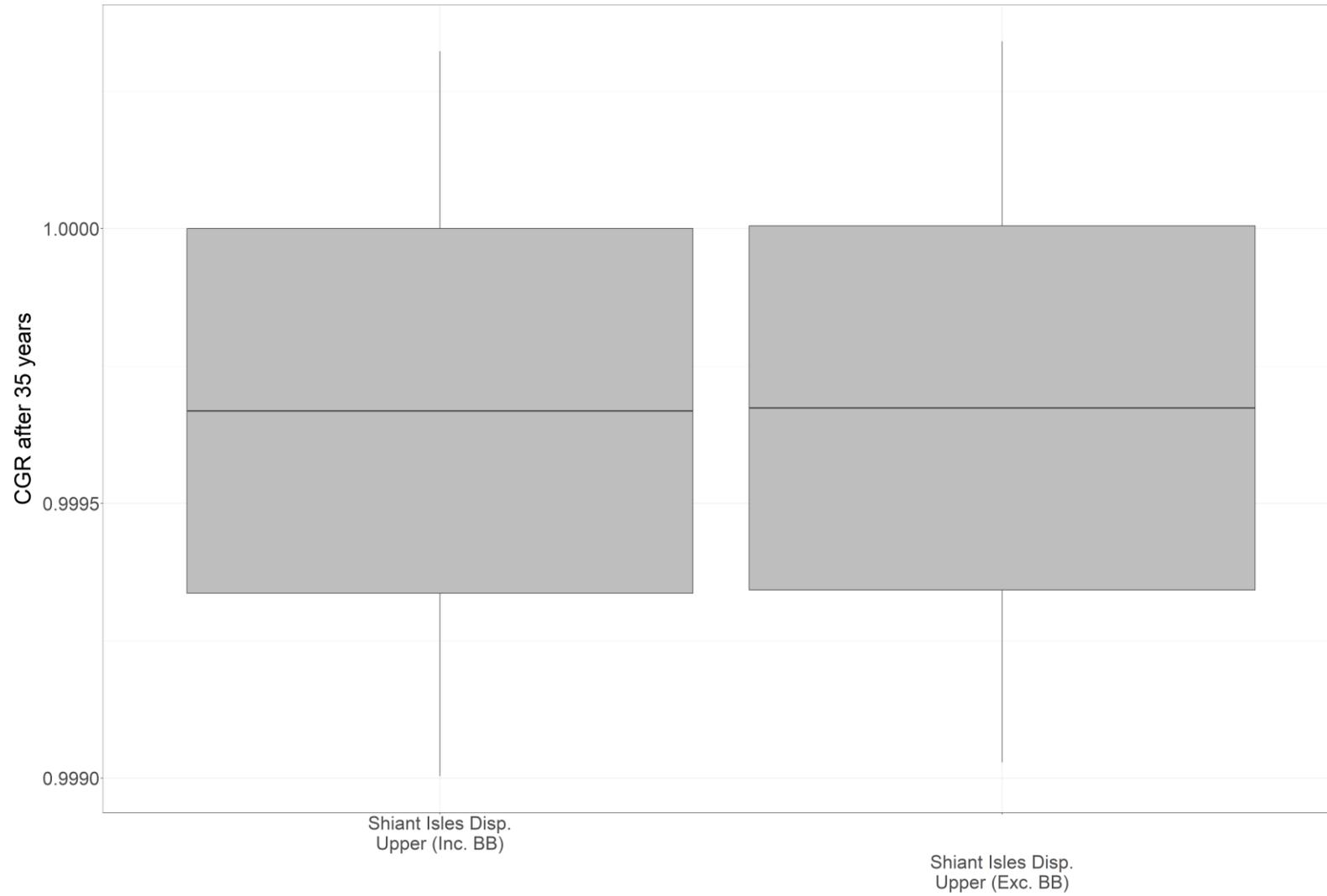


Plate 5-69 CPS after 35 Years for the Puffin Population at the Shiant Isles SPA.

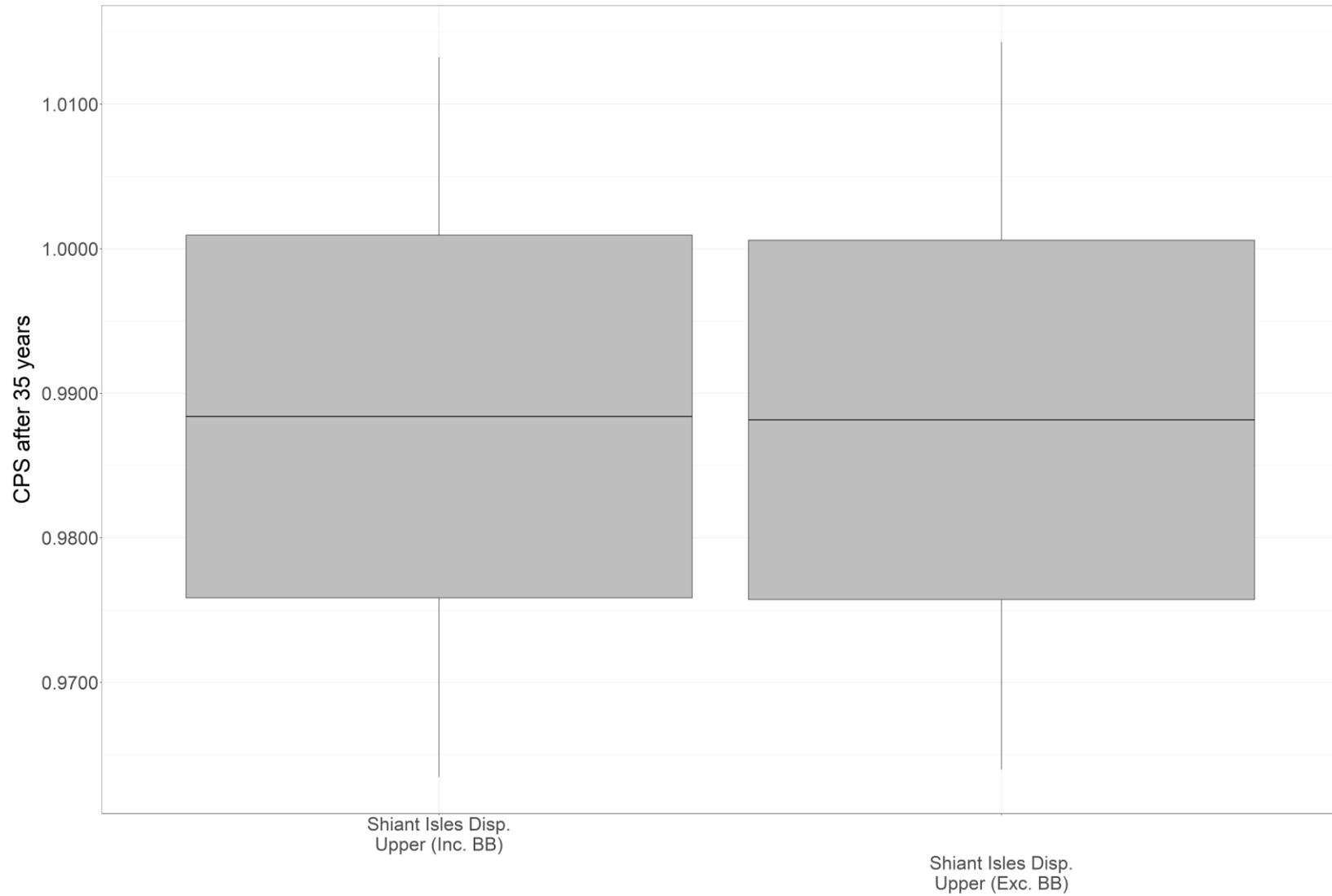


Plate 5-70 Puffin Population Projection over 35-50 Years at the St Kilda SPA.

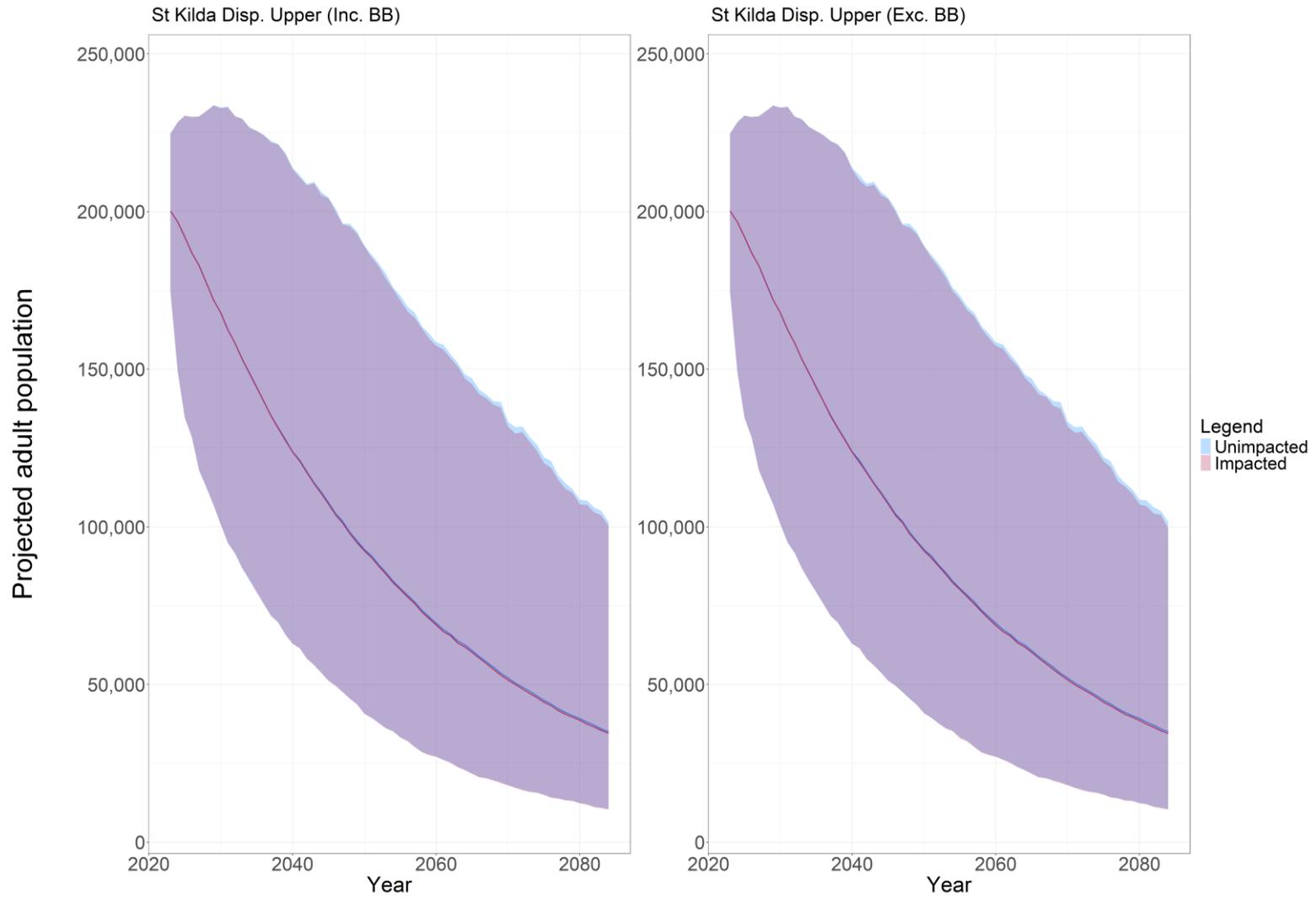


Plate 5-71 CGR after 35 Years for the Puffin Population at the St Kilda SPA.

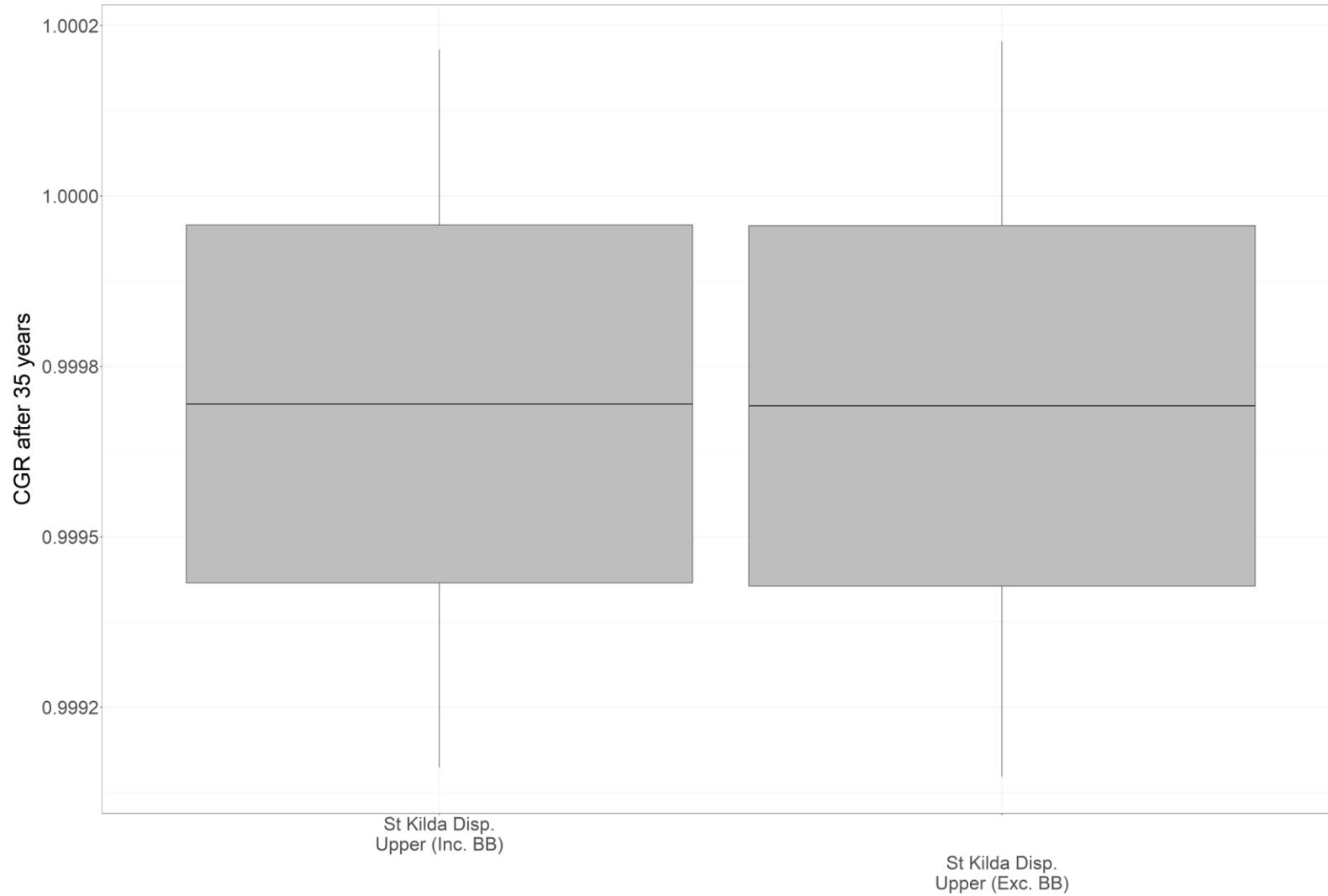


Plate 5-72 CPS after 35 Years for the Puffin Population at the St Kilda SPA.

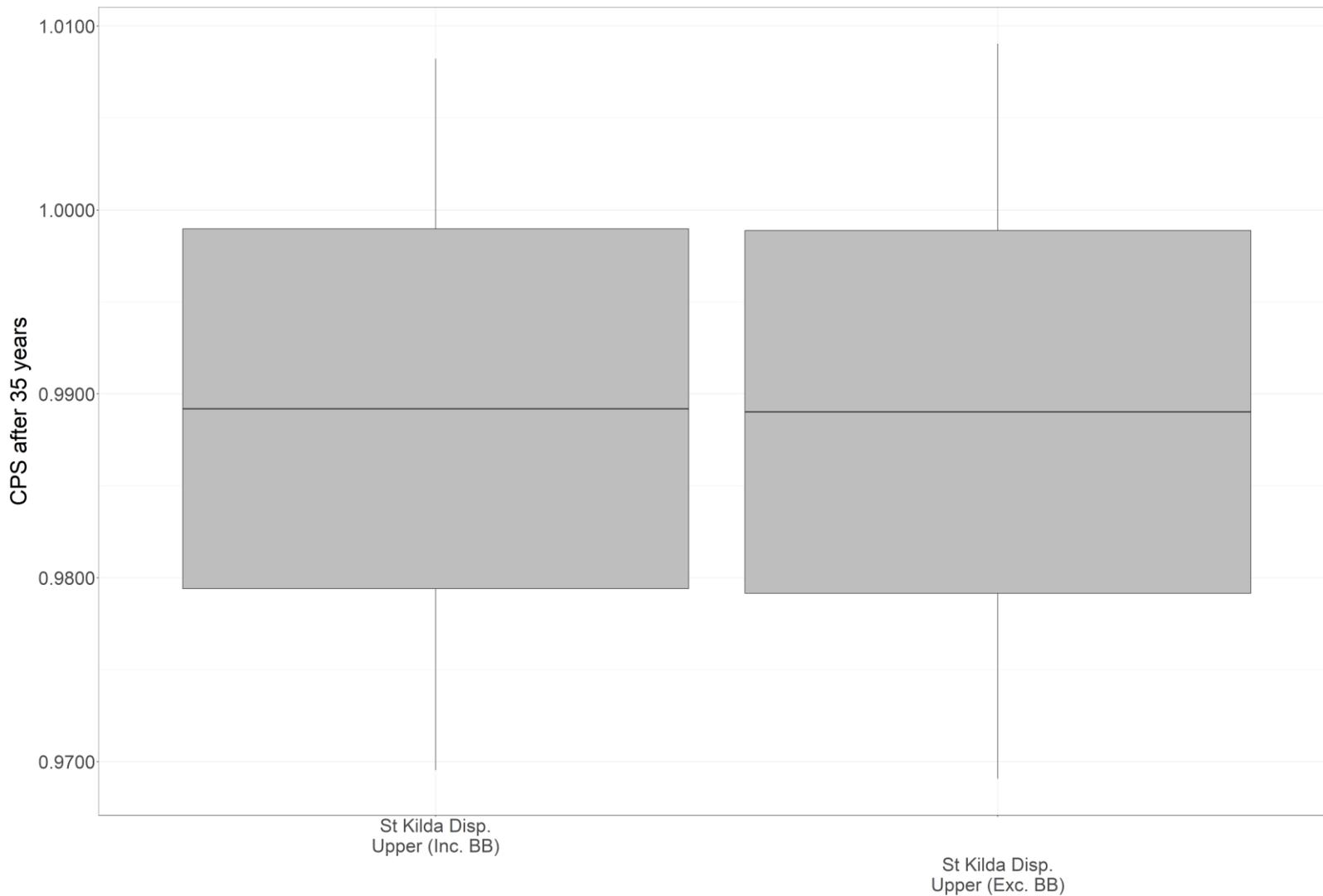


Plate 5-73 Puffin Population Projection over 35-50 Years at the Sule Skerry and Sule Stack SPA.

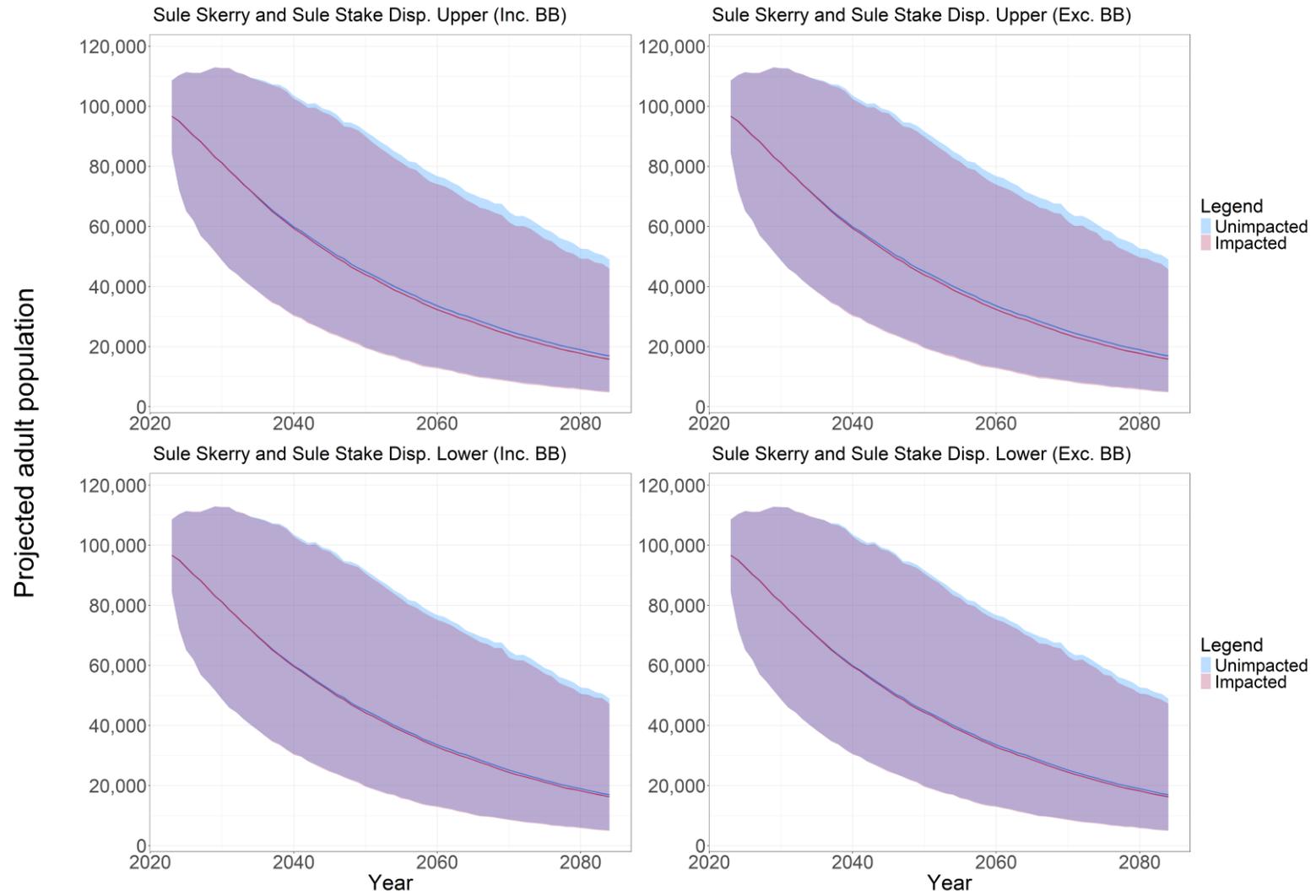


Plate 5-74 CGR after 35 Years for the Puffin Population at the Sule Skerry and Sule Stack SPA.

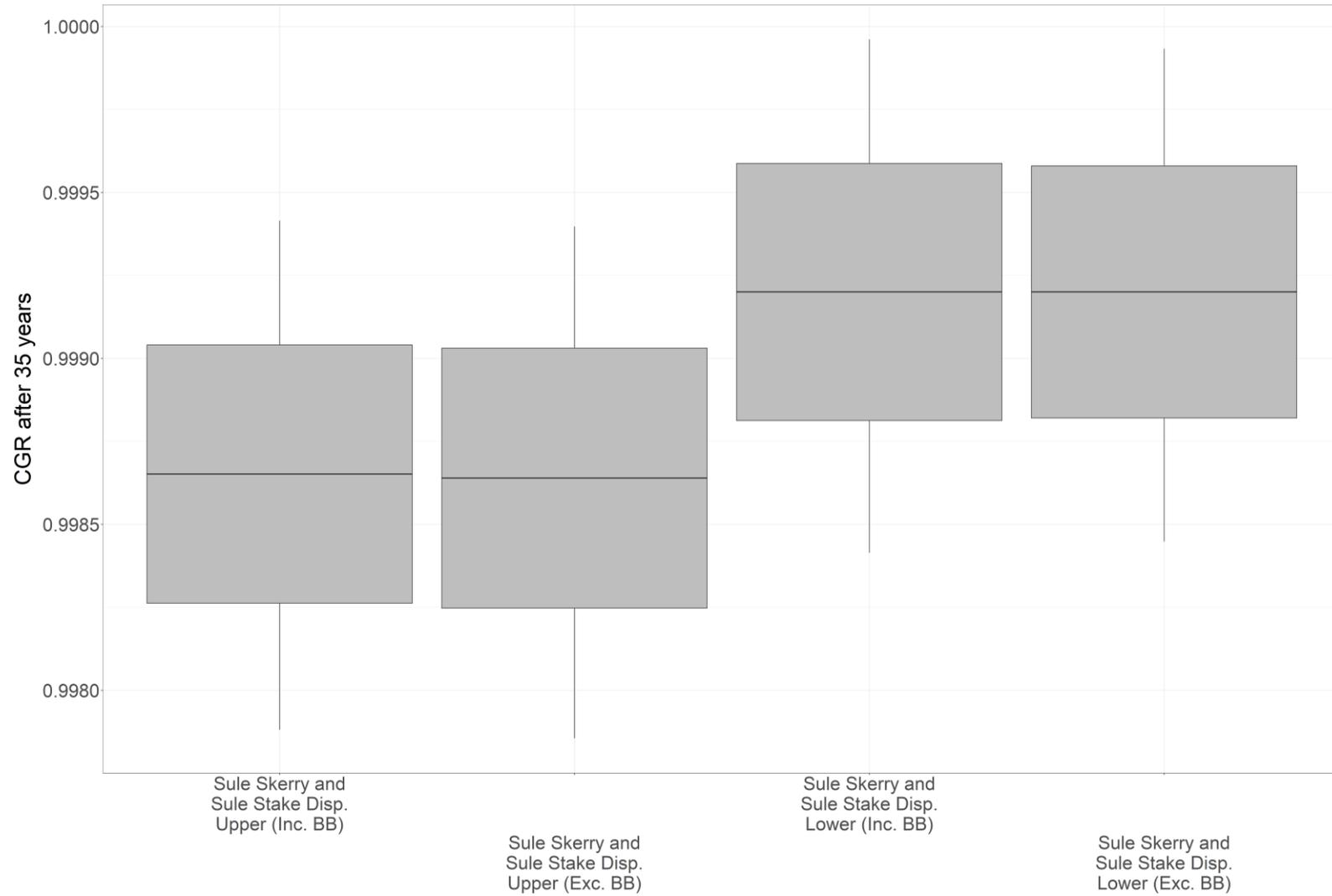
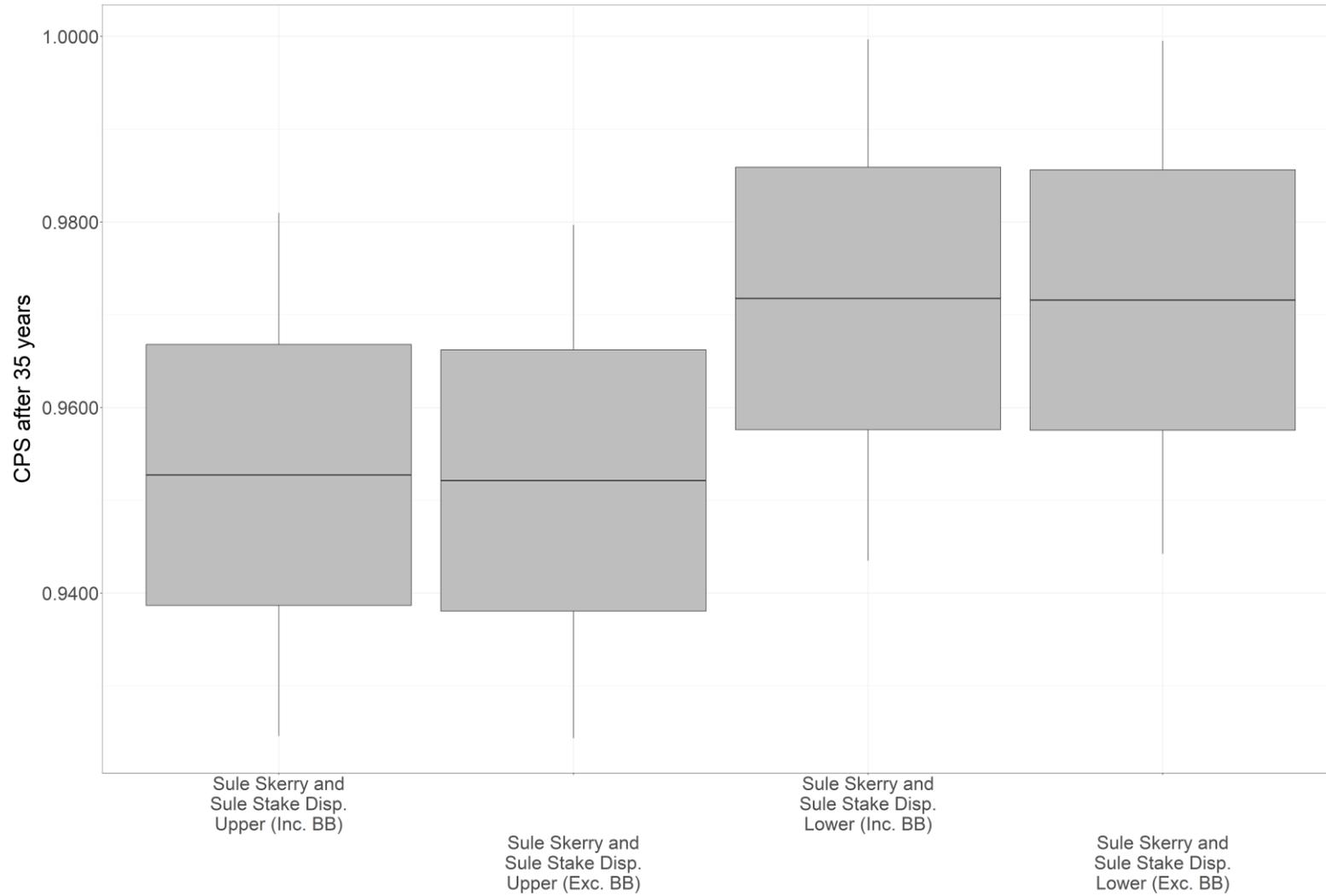


Plate 5-75 CPS after 35 Years for the Puffin Population at the Sule Skerry and Sule Stack SPA.



5.2.5 RED-THROATED DIVER

5.2.5.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the red-throated diver populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 5-5**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 5-76** to **Plate 5-78**.

Table 5-5 Offshore Project In-combination PVA Outputs for Red-throated Diver After 35 Years

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|---------------------|--|--|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate ((Between Unimpacted And Impacted) %) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Lewis Peatlands SPA | Baseline | 0 | 0.9709 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot and Applicant (100/10) | 0.83 | 0.9649 | 0.9933 | 0.7857 | 0.67 | 21.43 | 40.18 | 60.6 |

5.2.5.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Displacement NatureScot and Applicant (100/10) is presented as 'Disp.'.

Plate 5-76 Red-throated Diver Population Projection over 35-50 Years at the Lewis Peatlands SPA

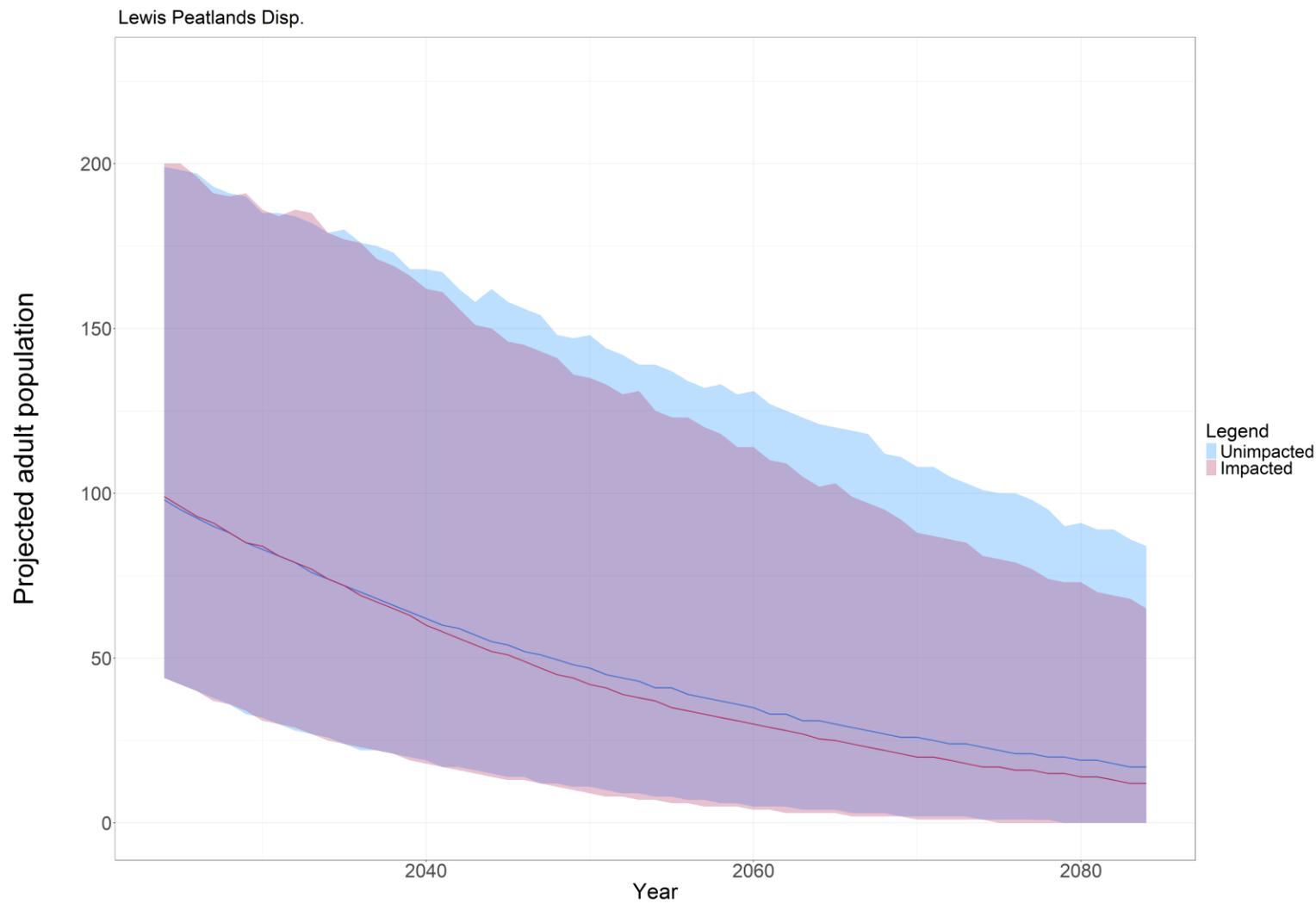


Plate 5-77 CGR after 35 Years for the Red-throated Diver Population at the Lewis Peatlands SPA

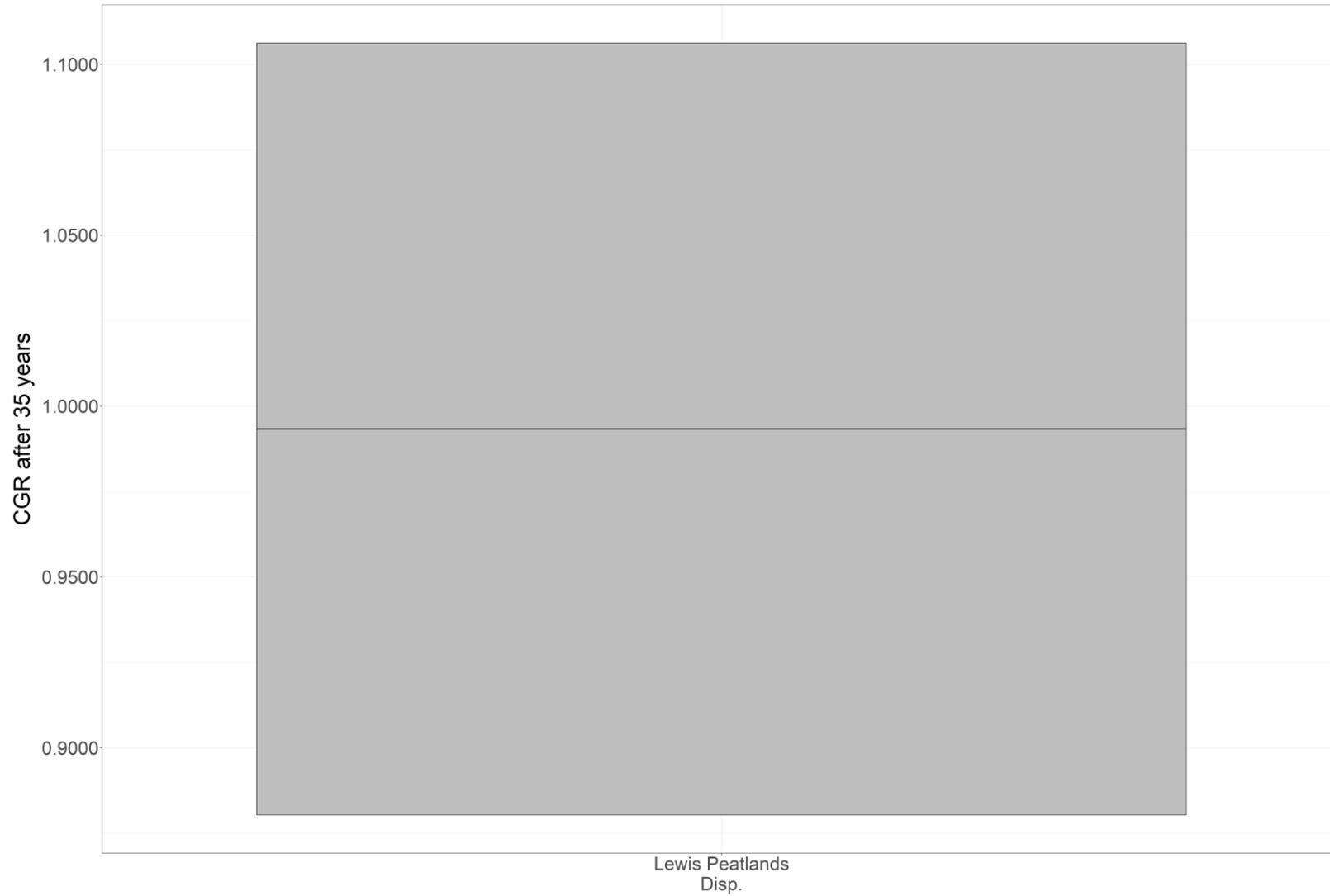
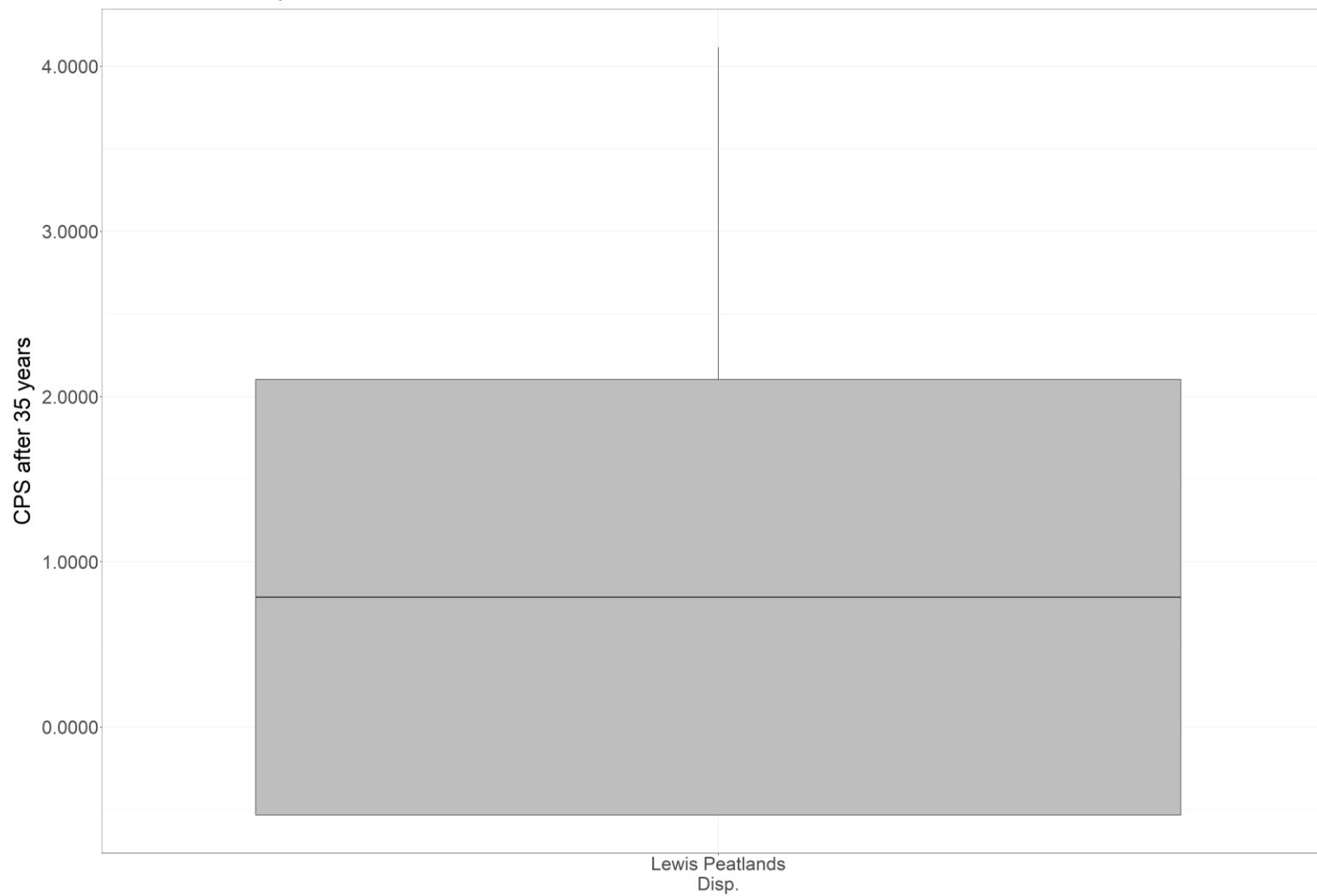


Plate 5-78 CPS after 35 Years for the Red-throated Diver Population at the Lewis Peatlands SPA



5.2.6 GANNET

5.2.6.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the gannet populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 35 year timespan are presented in **Table 5-6**. Population trajectories, graphs of CGR and graphs of CPS are presented in **Plate 5-79** to **Plate 5-102**.

Table 5-6 Offshore Project In-combination PVA Outputs for Gannet After 35 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Ailsa Craig SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 33.88 | 1.0117 | 0.9994 | 0.9787 | 0.06 | 2.13 | 45.48 | 54.16 |
| | Collision only (without Berwick Bank) | 32.24 | 1.0117 | 0.9994 | 0.9796 | 0.06 | 2.04 | 45.92 | 53.74 |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 42.72 | 1.0115 | 0.9992 | 0.9732 | 0.08 | 2.68 | 44.36 | 55.16 |
| | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 41.24 | 1.0115 | 0.9993 | 0.974 | 0.07 | 2.6 | 44.62 | 54.78 |
| | Combined Collisions and Displacement | 14.24 | 1.0121 | 0.9998 | 0.991 | 0.02 | 0.9 | 47.86 | 51.74 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | NatureScot Upper (70/3) (with Berwick Bank) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 13.75 | 1.0121 | 0.9998 | 0.9915 | 0.02 | 0.85 | 48.22 | 51.72 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 76.60 | 1.0109 | 0.9986 | 0.9524 | 0.14 | 4.76 | 40.98 | 58.66 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 73.48 | 1.011 | 0.9987 | 0.9543 | 0.13 | 4.57 | 40.98 | 58.4 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Forth Islands SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 431.31 | 1.0089 | 0.9966 | 0.8854 | 0.34 | 11.46 | 28.76 | 69.98 |
| | Displacement NatureScot Upper (70/3) | 335.88 | 1.0097 | 0.9974 | 0.9094 | 0.26 | 9.06 | 33.08 | 65.78 |
| | Displacement NatureScot Lower and Applicant (70/1) | 111.96 | 1.0115 | 0.9991 | 0.9691 | 0.09 | 3.09 | 43.9 | 55.94 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) | 767.19 | 1.0062 | 0.994 | 0.8050 | 0.60 | 19.50 | 15.74 | 83.56 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 543.27 | 1.008 | 0.9957 | 0.8577 | 0.43 | 14.23 | 23.82 | 74.94 |
| Grassholm SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|--|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Collision only | 22.54 | 1.0119 | 0.9996 | 0.9866 | 0.04 | 1.34 | 47.72 | 52.3 |
| | Displacement NatureScot Upper (70/3) | 31.14 | 1.0118 | 0.9995 | 0.9816 | 0.05 | 1.84 | 46.32 | 53.28 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) | 53.68 | 1.0115 | 0.9991 | 0.9687 | 0.09 | 3.13 | 43.56 | 55.82 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 32.92 | 1.0118 | 0.9995 | 0.9808 | 0.05 | 1.92 | 46.10 | 53.72 |
| Hermaness, Saxa Vord and Valla Field SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 22.01 | 1.0119 | 0.9996 | 0.9842 | 0.04 | 1.58 | 47.14 | 53.22 |
| | Displacement NatureScot Upper (70/3) | 76.02 | 1.0108 | 0.9985 | 0.9468 | 0.15 | 5.32 | 39.56 | 59.78 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| SPA | Displacement NatureScot Lower and Applicant (70/1) | 25.34 | 1.0118 | 0.9995 | 0.9819 | 0.05 | 1.81 | 46.52 | 53.54 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) | 98.03 | 1.0104 | 0.998 | 0.9318 | 0.20 | 6.82 | 36.92 | 62.10 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 47.35 | 1.0114 | 0.9991 | 0.9662 | 0.09 | 3.38 | 43.9 | 56.38 |
| North Rona and Sula Sgeir SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 9.16 | 1.0119 | 0.9996 | 0.9844 | 0.04 | 1.56 | 47.32 | 53.1 |
| | Collision only (without Berwick Bank) | 9.14 | 1.0119 | 0.9996 | 0.9842 | 0.04 | 1.58 | 47.36 | 53.2 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | Quantiles | | |
|-----|---|---|---------------------------------------|------------|------------|--|--|---------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 10.00 | 1.0118 | 0.9995 | 0.9826 | 0.05 | 1.74 | 46.56 | 53.26 |
| | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 9.77 | 1.0118 | 0.9995 | 0.983 | 0.05 | 1.7 | 46.68 | 53.32 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 19.16 | 1.0114 | 0.9991 | 0.9672 | 0.09 | 3.28 | 43.72 | 56.28 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 18.91 | 1.0114 | 0.9991 | 0.9676 | 0.09 | 3.24 | 43.72 | 55.94 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|----------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 12.49 | 1.0117 | 0.9994 | 0.9784 | 0.06 | 2.16 | 46.02 | 54.10 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 12.40 | 1.0117 | 0.9994 | 0.9788 | 0.06 | 2.12 | 45.90 | 54.00 |
| Noss SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 13.70 | 1.0117 | 0.9994 | 0.979 | 0.06 | 2.10 | 46.14 | 54.20 |
| | Collision only (without Berwick Bank) | 13.16 | 1.0117 | 0.9994 | 0.9797 | 0.06 | 2.03 | 46.3 | 53.82 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 33.75 | 1.0109 | 0.9986 | 0.9494 | 0.14 | 5.06 | 40.16 | 58.92 |
| | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 32.26 | 1.0109 | 0.9986 | 0.9518 | 0.14 | 4.82 | 40.72 | 58.74 |
| | Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 11.25 | 1.0118 | 0.9995 | 0.9828 | 0.05 | 1.72 | 46.78 | 53.18 |
| | Displacement NatureScot Lower (70/1) and Applicant (without Berwick Bank) | 10.75 | 1.0119 | 0.9995 | 0.9835 | 0.05 | 1.65 | 46.90 | 52.98 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 47.45 | 1.0103 | 0.9980 | 0.9295 | 0.20 | 7.05 | 36.50 | 62.44 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 45.56 | 1.0104 | 0.9981 | 0.9325 | 0.19 | 6.75 | 37.28 | 62.18 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 24.95 | 1.0113 | 0.9989 | 0.9624 | 0.11 | 3.76 | 42.62 | 56.98 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 23.91 | 1.0113 | 0.999 | 0.9639 | 0.10 | 3.61 | 42.54 | 56.52 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|--------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (without Berwick Bank) | | | | | | | | |
| St Kilda SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 29.56 | 1.012 | 0.9997 | 0.9884 | 0.03 | 1.16 | 47.78 | 52.14 |
| | Collision only (without Berwick Bank) | 29.22 | 1.012 | 0.9997 | 0.9889 | 0.03 | 1.11 | 47.96 | 52.04 |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 42.72 | 1.0119 | 0.9996 | 0.9850 | 0.04 | 1.50 | 46.92 | 52.92 |
| | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 41.24 | 1.0119 | 0.9996 | 0.9856 | 0.04 | 1.44 | 46.98 | 52.76 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 71.91 | 1.0116 | 0.9993 | 0.9737 | 0.07 | 2.63 | 44.70 | 54.96 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 70.31 | 1.0116 | 0.9993 | 0.9746 | 0.07 | 2.54 | 44.88 | 54.80 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 43.68 | 1.0119 | 0.9995 | 0.9834 | 0.05 | 1.66 | 46.6 | 53.08 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 42.92 | 1.0119 | 0.9996 | 0.9842 | 0.04 | 1.58 | 46.72 | 52.82 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|--------------------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (without Berwick Bank) | | | | | | | | |
| Sule Skerry and Sule Stack SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 27.10 | 1.0106 | 0.9982 | 0.9385 | 0.18 | 6.15 | 38.18 | 61.08 |
| | Collision only (without Berwick Bank) | 26.69 | 1.0106 | 0.9983 | 0.9395 | 0.17 | 6.05 | 38.52 | 60.78 |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 18.14 | 1.0111 | 0.9988 | 0.9587 | 0.12 | 4.13 | 41.82 | 57.52 |
| | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 17.98 | 1.0112 | 0.9988 | 0.9585 | 0.12 | 4.15 | 41.96 | 57.36 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 6.05 | 1.0119 | 0.9996 | 0.9858 | 0.04 | 1.42 | 47.72 | 52.84 |
| | Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 5.99 | 1.0119 | 0.9996 | 0.9857 | 0.04 | 1.43 | 47.90 | 52.46 |
| | Combined Collisions and Displacement NatureScot Upper (with Berwick Bank) | 45.24 | 1.0093 | 0.9971 | 0.8996 | 0.29 | 10.04 | 31.16 | 67.46 |
| | Combined Collisions and Displacement NatureScot Upper (without Berwick Bank) | 44.67 | 1.0094 | 0.9971 | 0.9006 | 0.29 | 9.94 | 31.00 | 67.32 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 33.15 | 1.0101 | 0.9979 | 0.9255 | 0.21 | 7.45 | 35.92 | 63.26 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 32.68 | 1.0102 | 0.9979 | 0.9262 | 0.21 | 7.38 | 36.20 | 62.98 |

5.2.6.2 Within the following plates the impact scenarios have been shorted to aid readability of the graphs, as follows.

- Collisions only is presented as 'Col.';
- Displacement NatureScot Upper (70/3) is presented as 'Disp. Upper';
- Displacement NatureScot Lower and Applicant (70/1) is presented as 'Disp. Lower';
- Combined Collisions and Displacement NatureScot Upper (70/3) is presented as 'Comb. Upper';
- Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) is presented as 'Comb. Lower';

- The scenarios with Berwick Bank are presented as '(Inc. BB)';
- The scenarios without Berwick Bank are presented as '(Exc. BB).

Plate 5-79 Gannet Population Projections over 35-50 Years at the Ailsa Craig SPA.

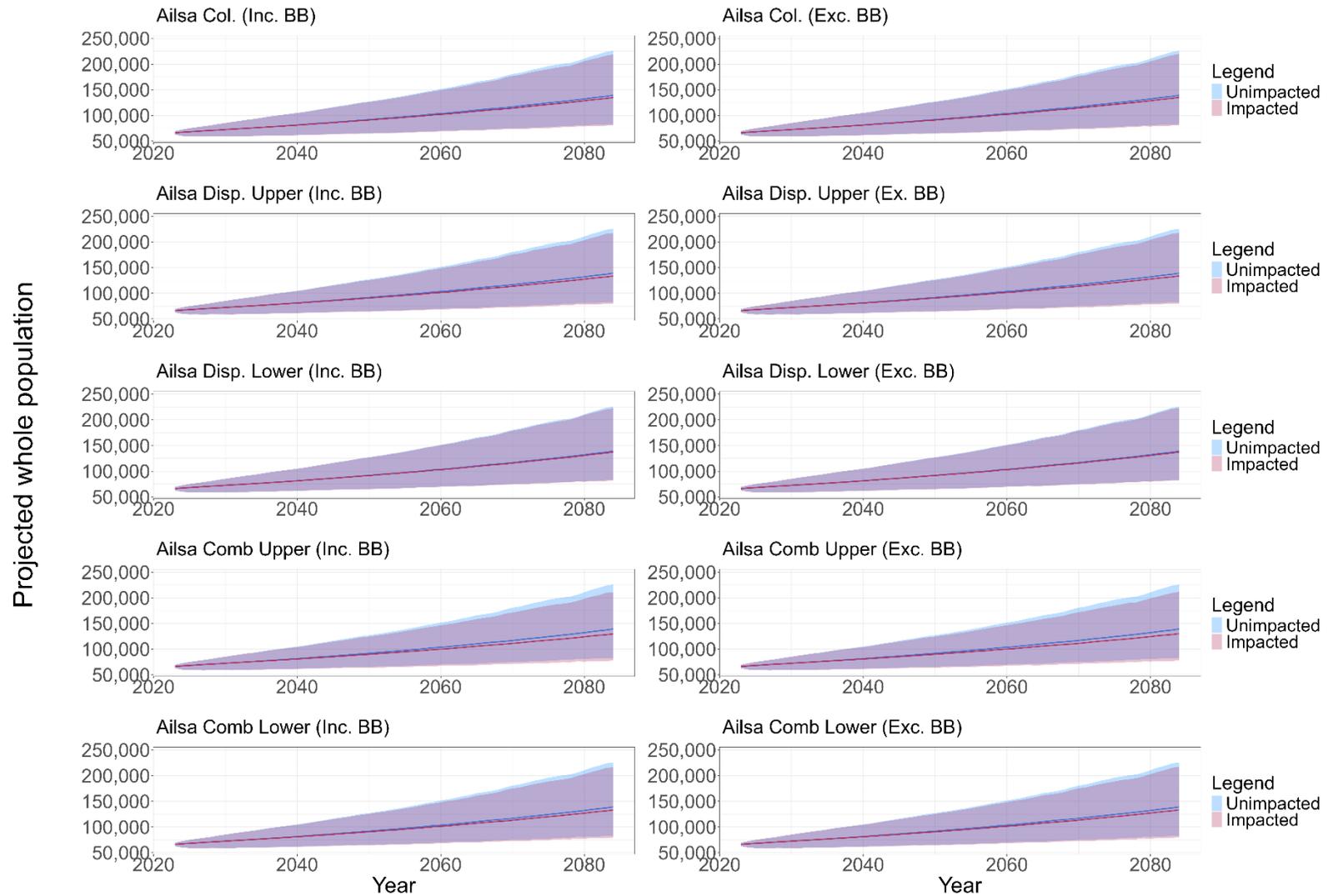


Plate 5-80 CGR after 35 Years for the Gannet Population at the Ailsa Craig SPA.

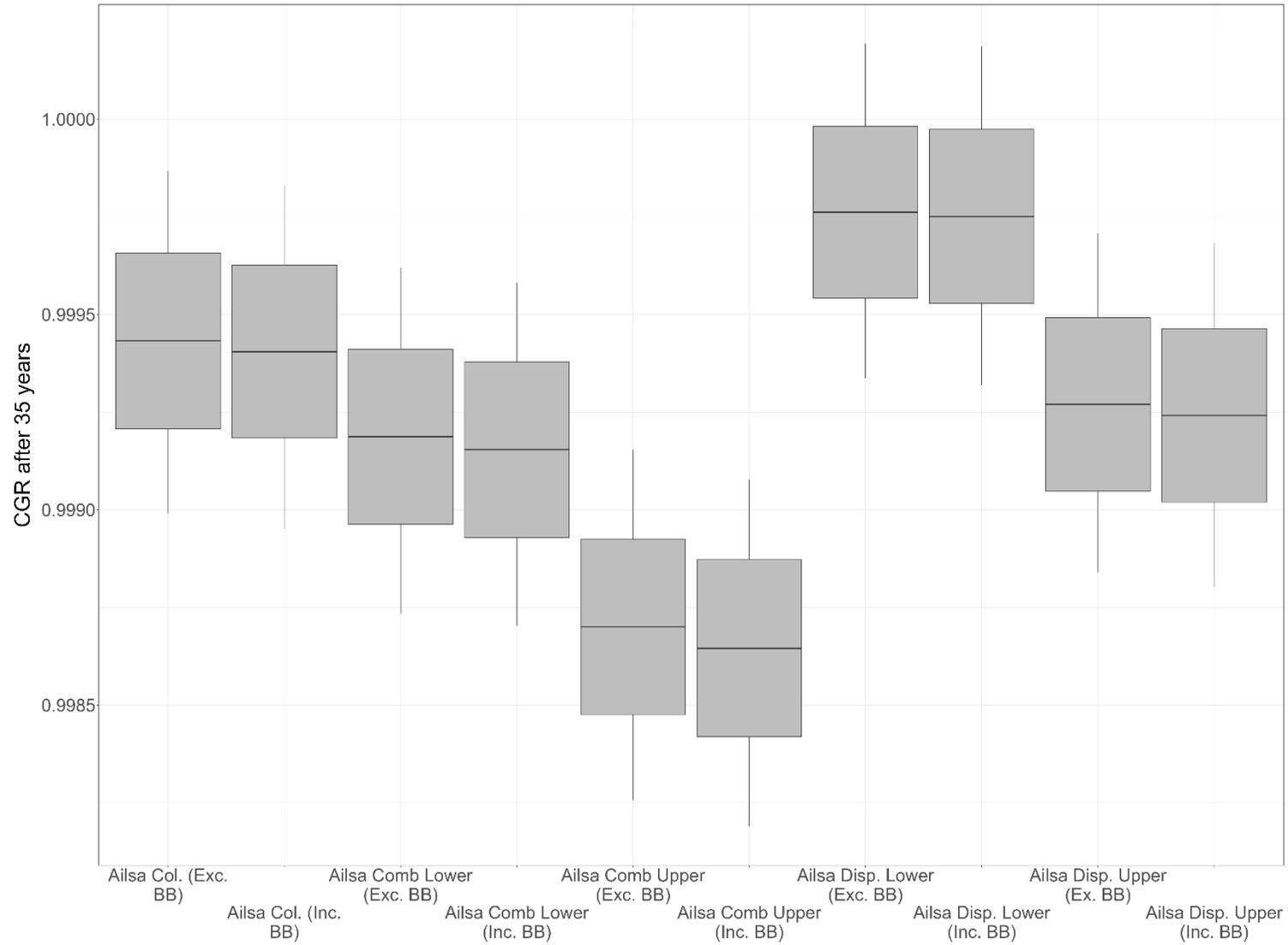


Plate 5-81 CPS after 35 Years for the Gannet Population at the Ailsa Craig SPA.

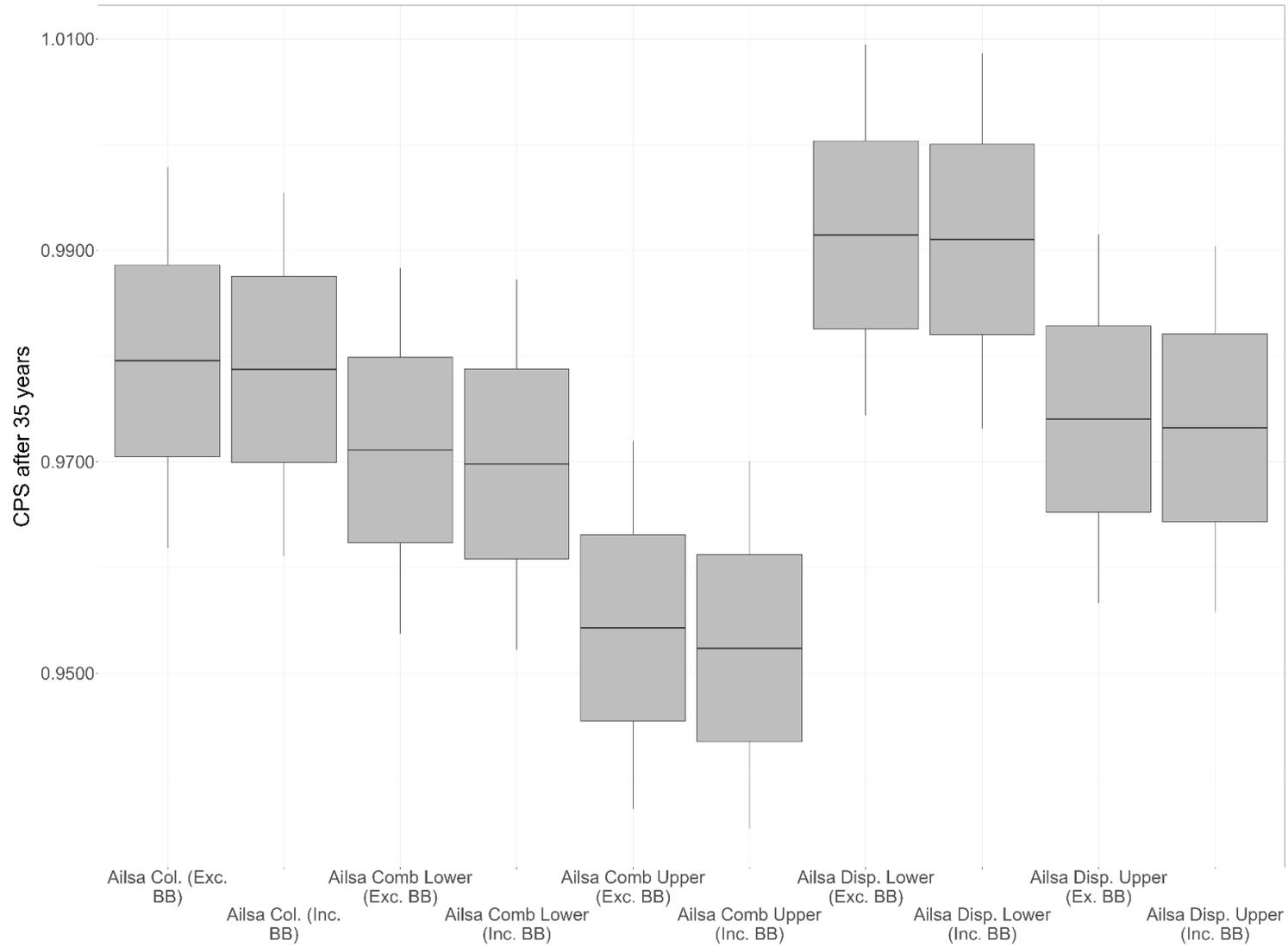


Plate 5-82 Gannet Population Projections over 35-50 Years at the Forth Islands SPA.

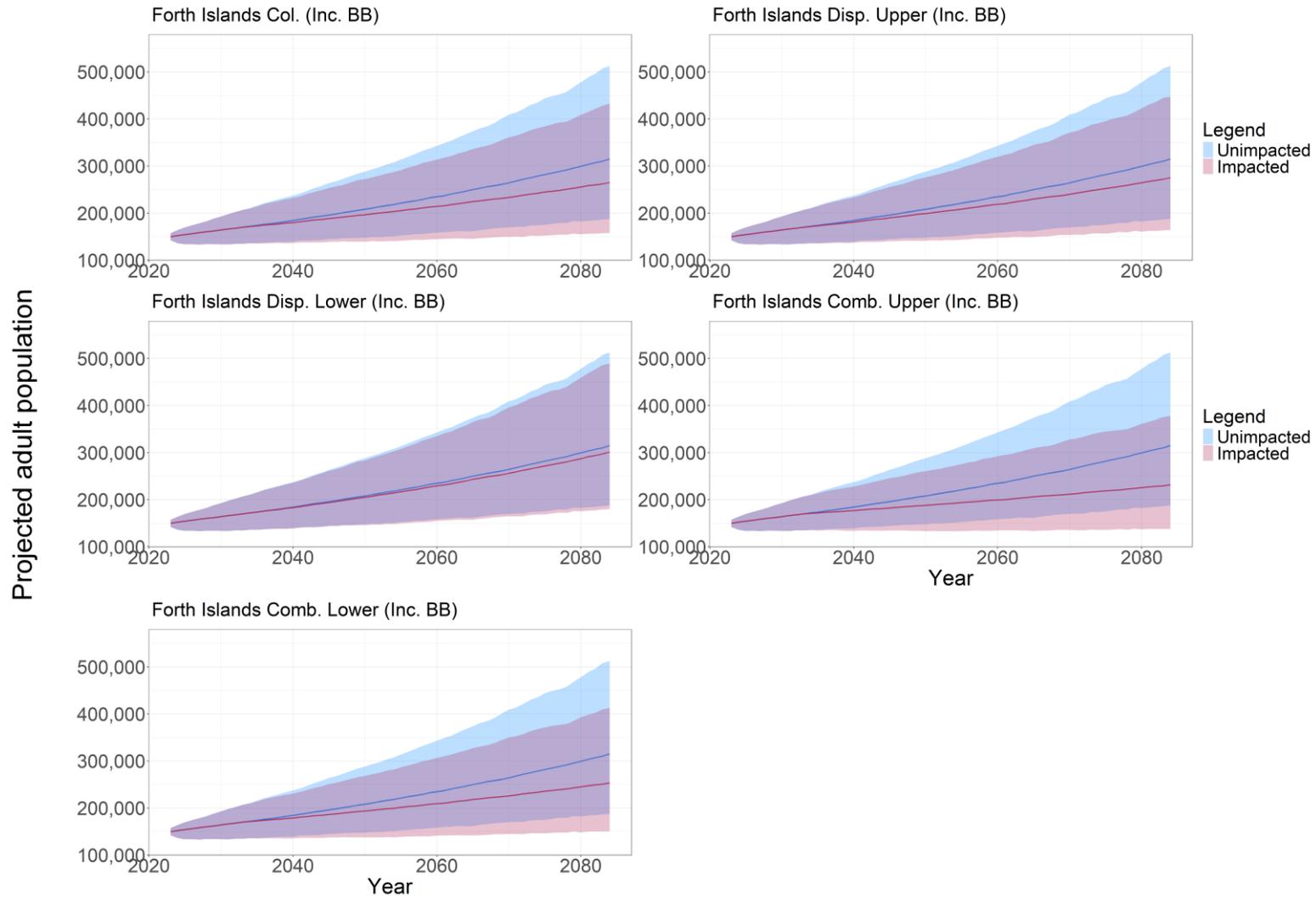


Plate 5-83 CGR after 35 Years for the Gannet Population at the Forth Islands SPA.

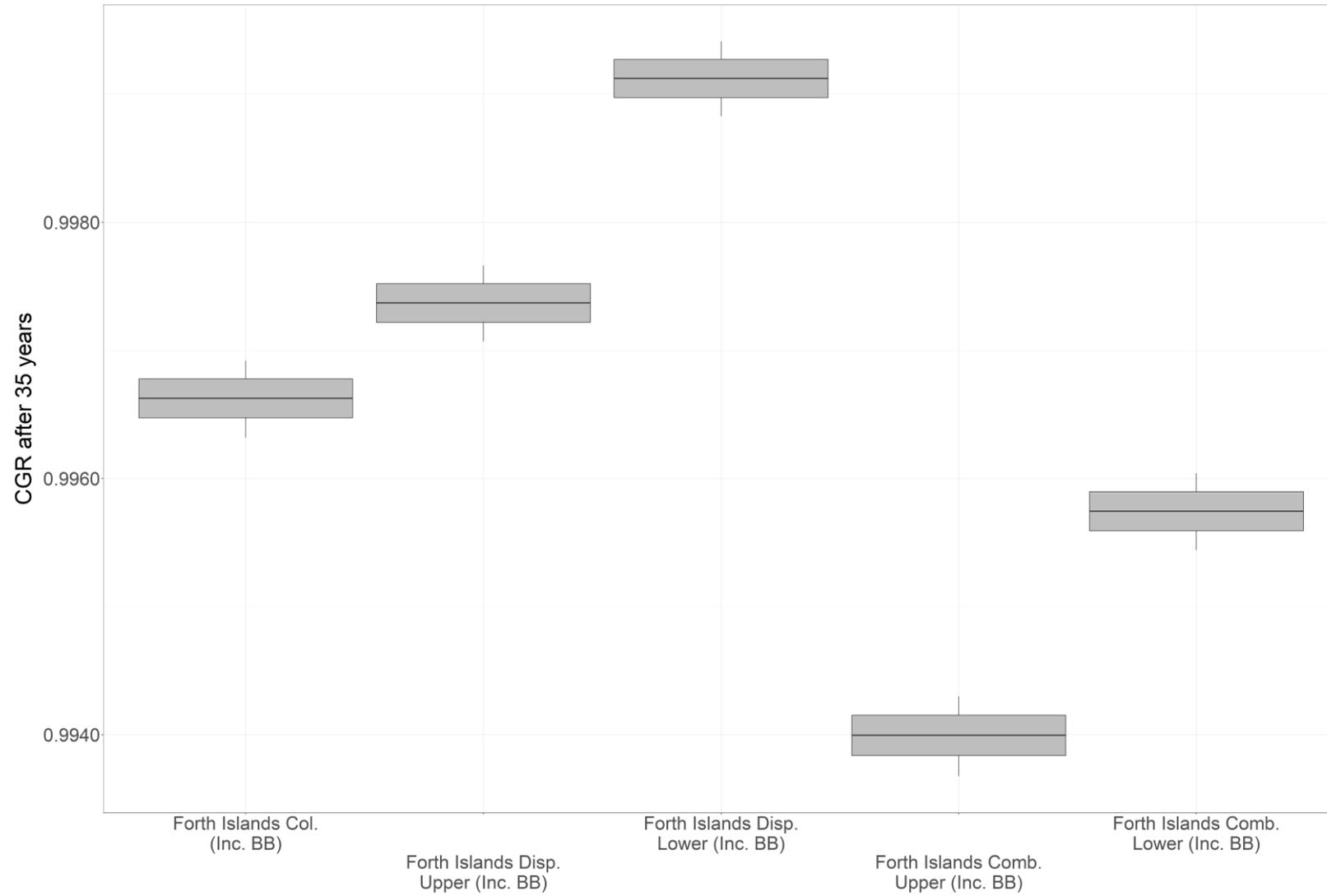


Plate 5-84 CPS after 35 Years for the Gannet Population at the Forth Islands SPA.

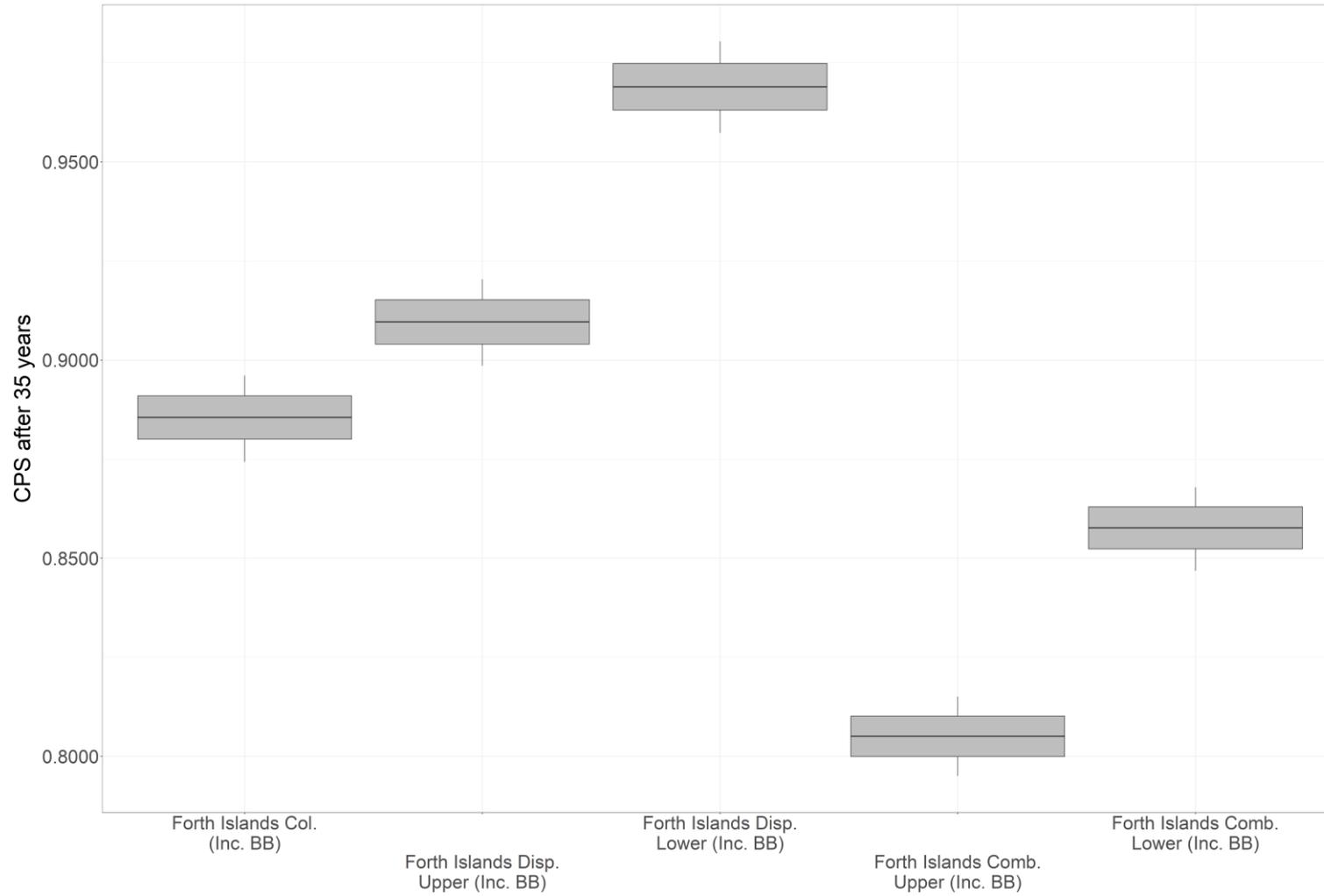


Plate 5-85 Gannet Population Projections over 35-50 Years at the Grassholm SPA.

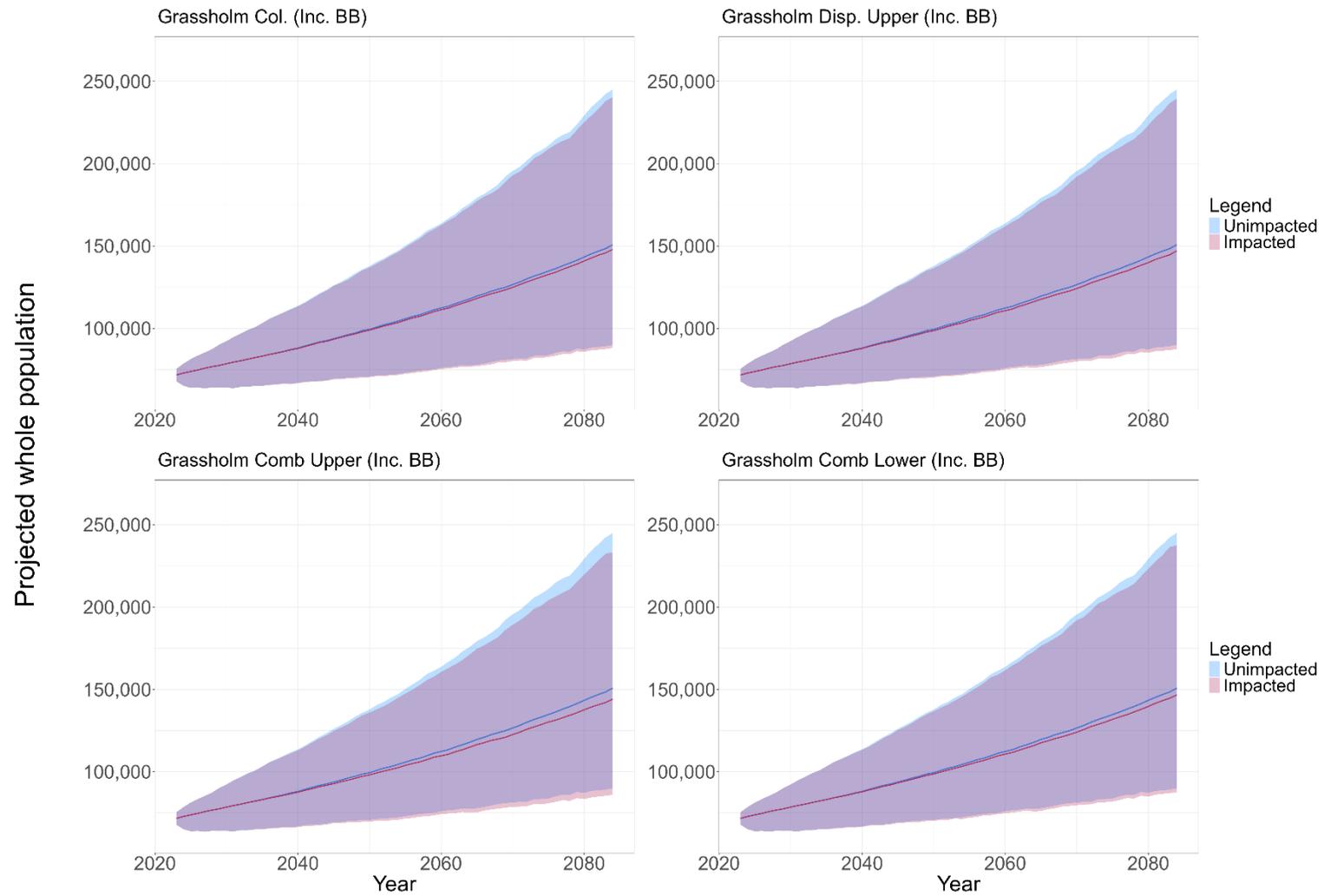


Plate 5-86 CGR after 35 Years for the Gannet Population at the Grassholm SPA.

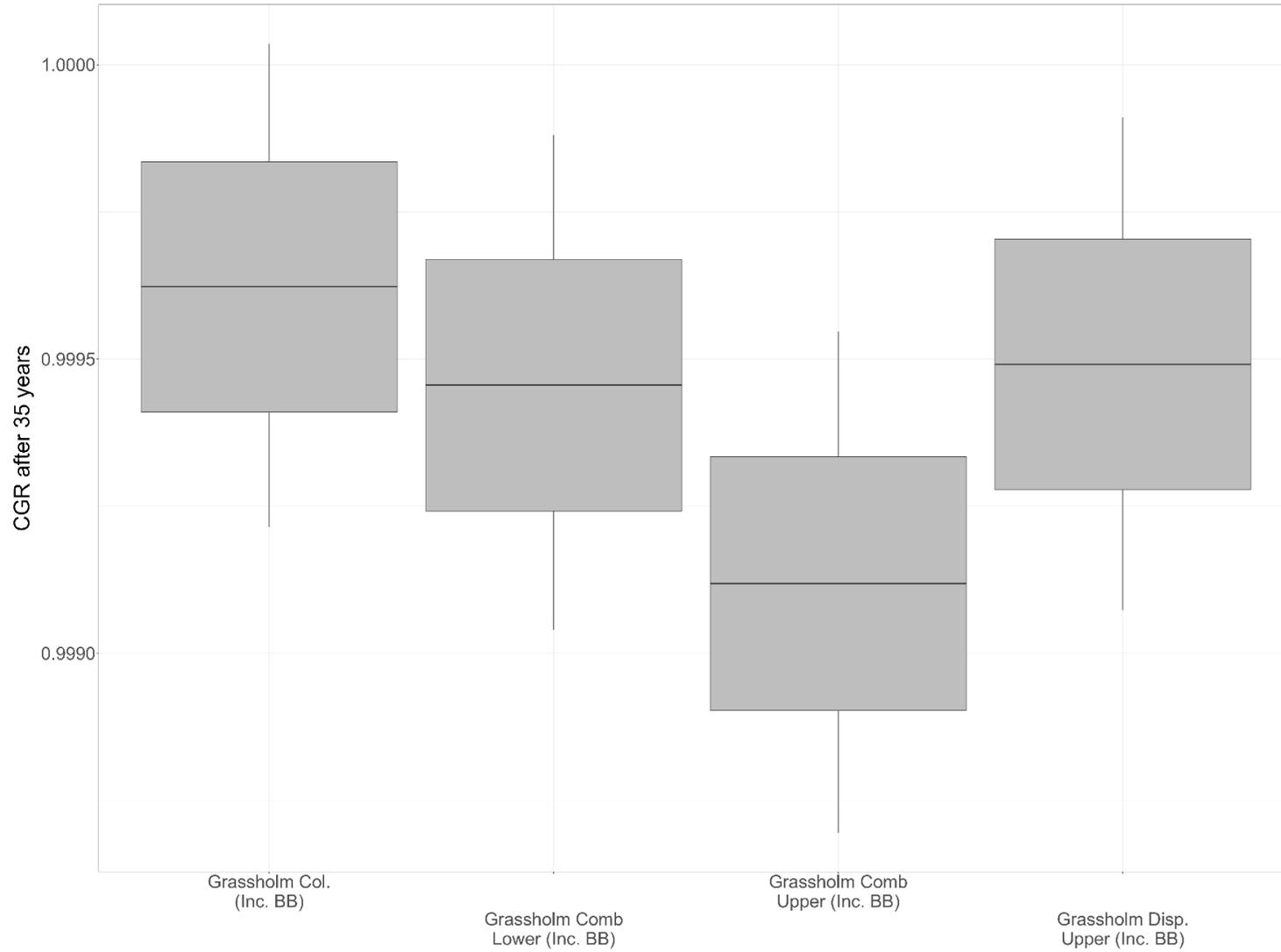


Plate 5-87 CPS after 35 Years for the Gannet Population at the Grassholm SPA.

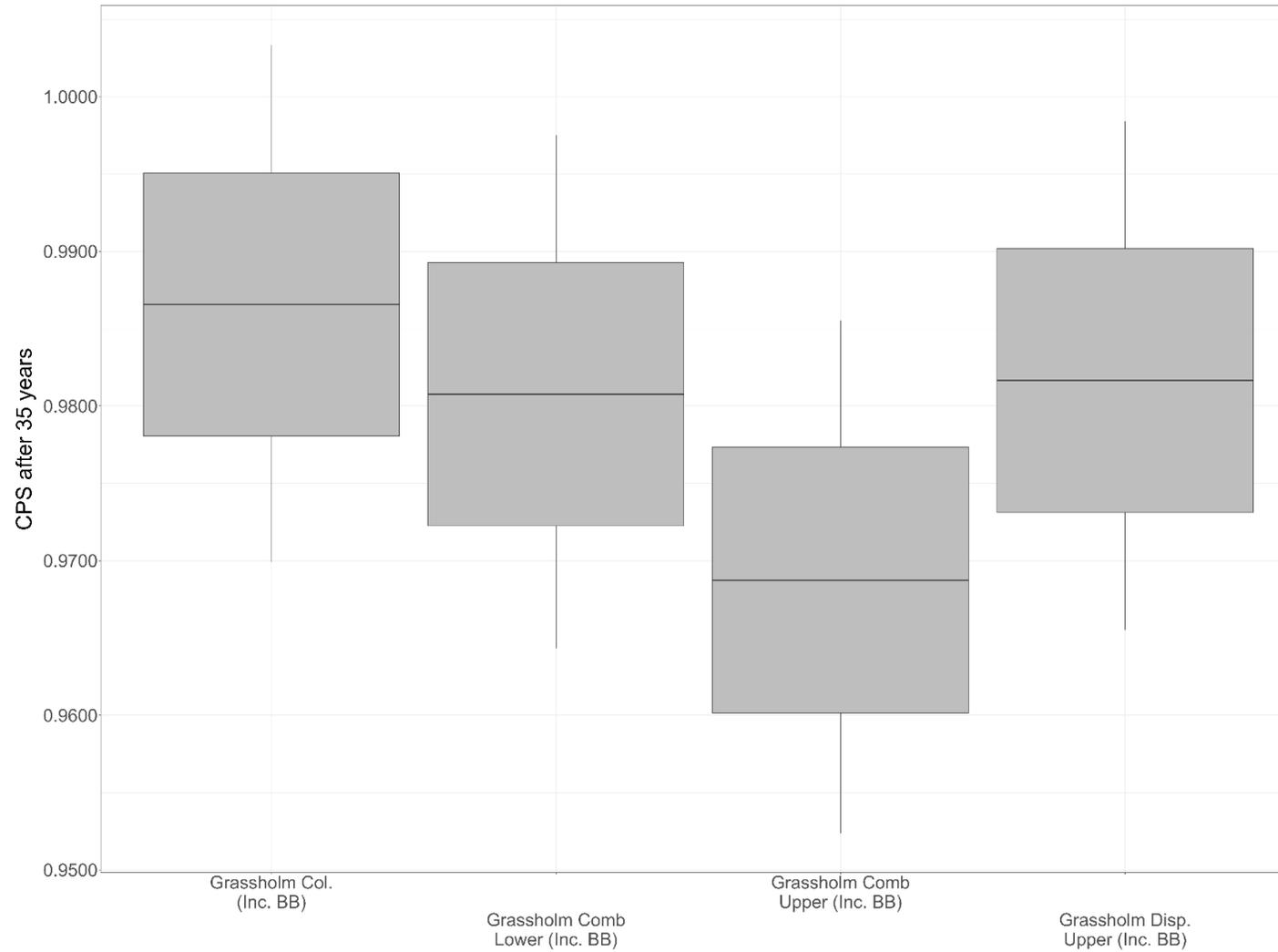


Plate 5-88 Gannet Population Projections over 35-50 Years at the Hermaness, Saxa Vord and Valla Field SPA.

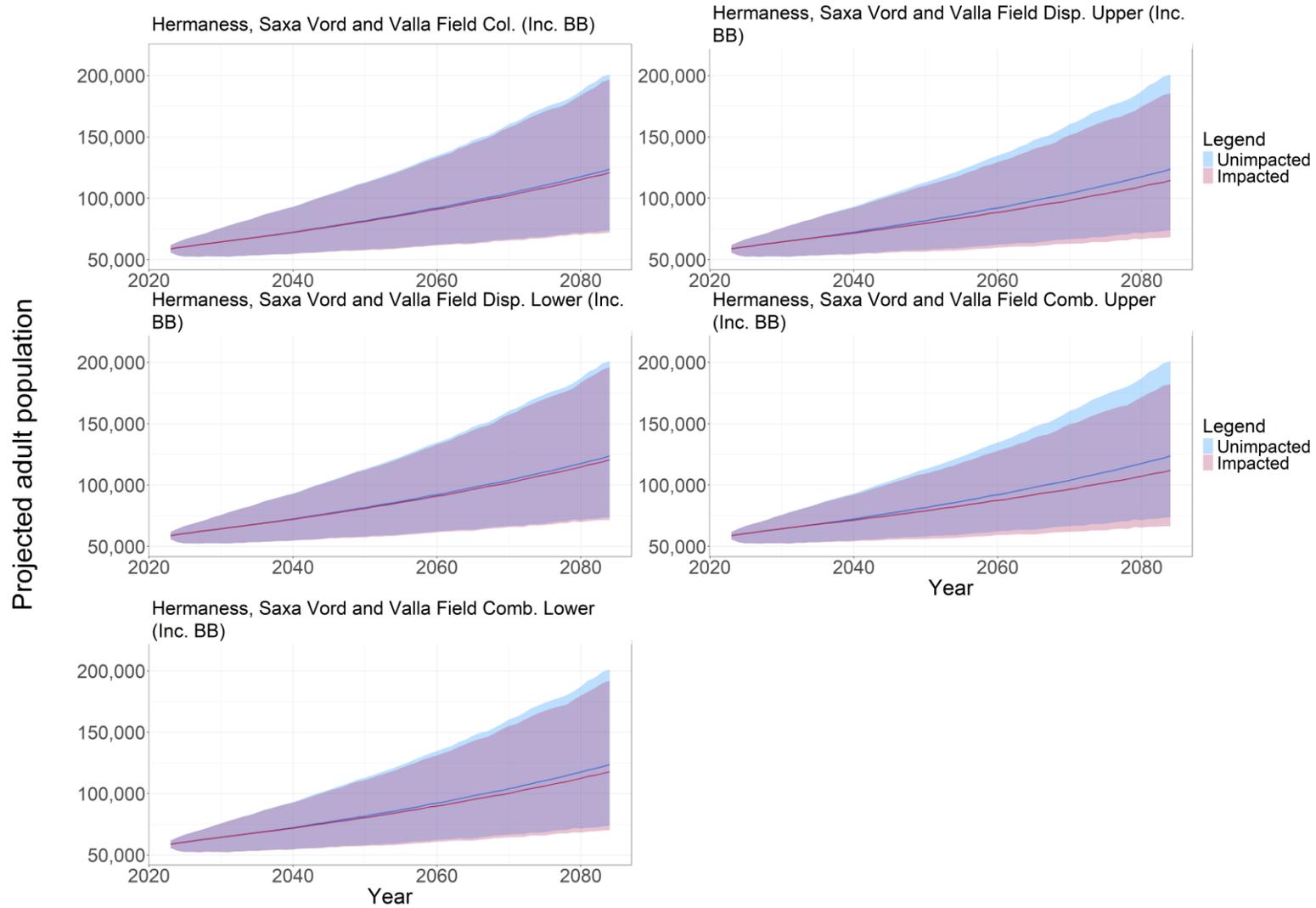


Plate 5-89 CGR after 35 Years for the Gannet Population at the Hermaness, Saxa Vord and Valla Field SPA.

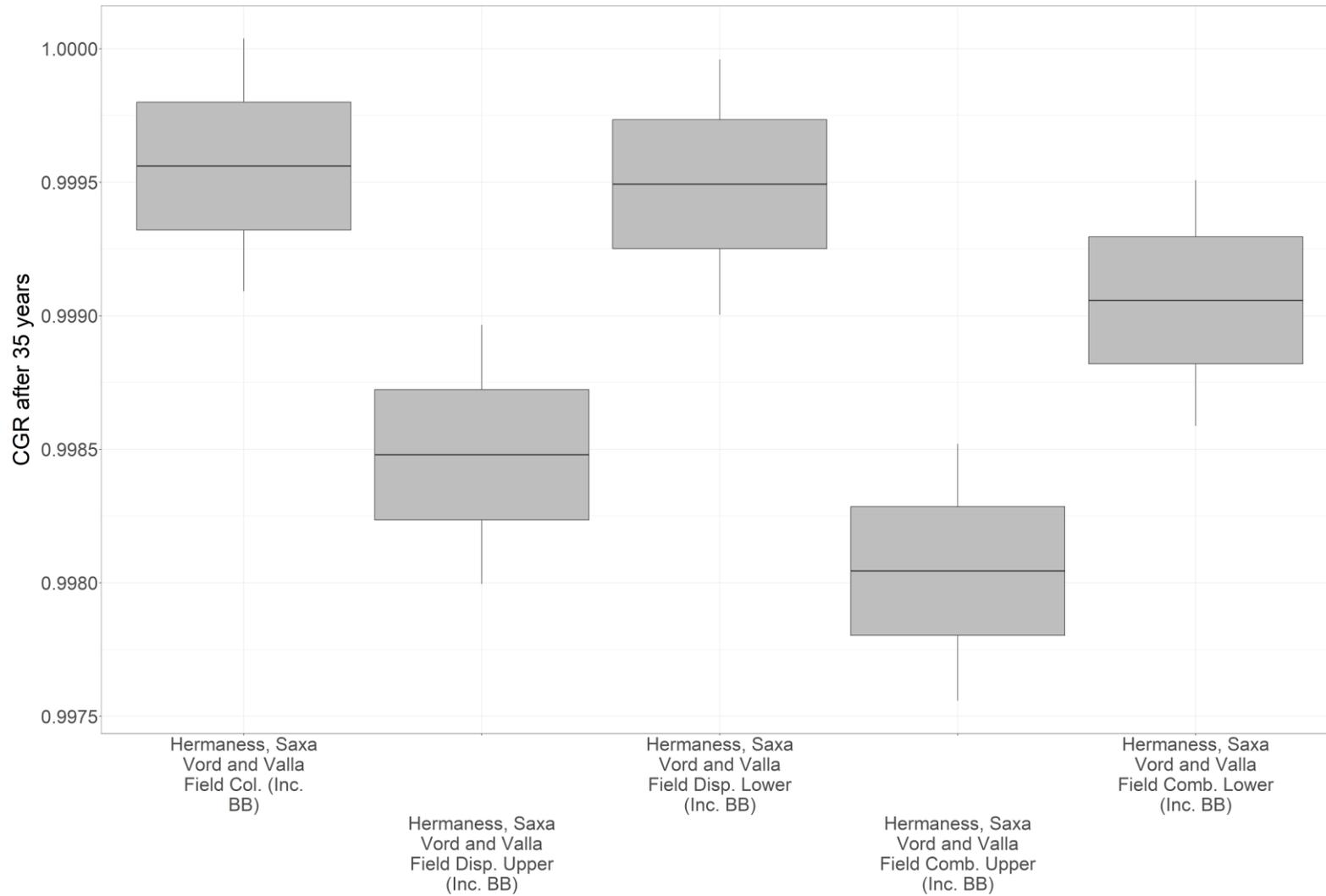


Plate 5-90 CPS after 35 Years for the Gannet Population at the Hermaness, Saxa Vord and Valla Field SPA.

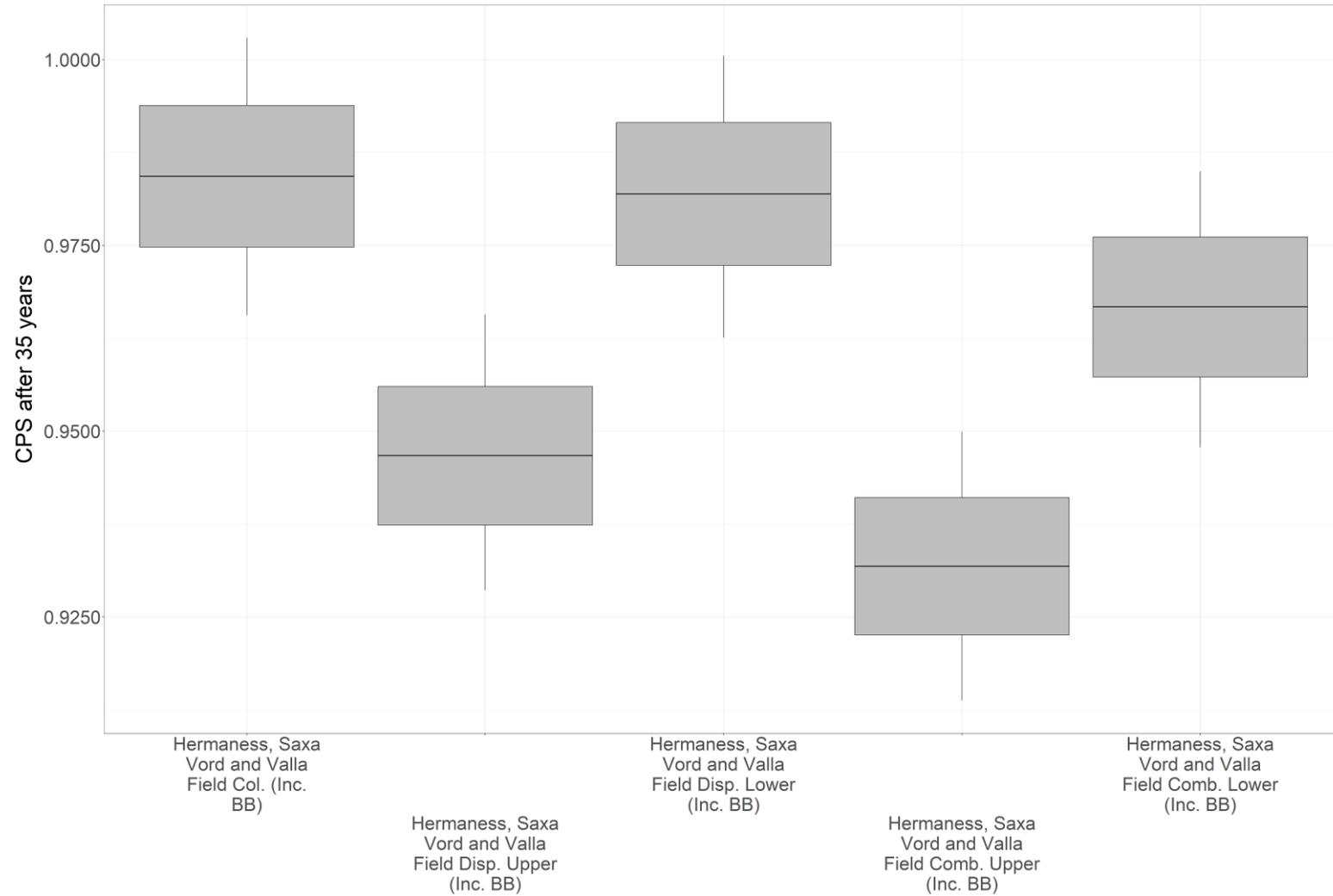


Plate 5-91 Gannet Population Projections over 35-50 Years at the North Rona and Sula Sgeir SPA.

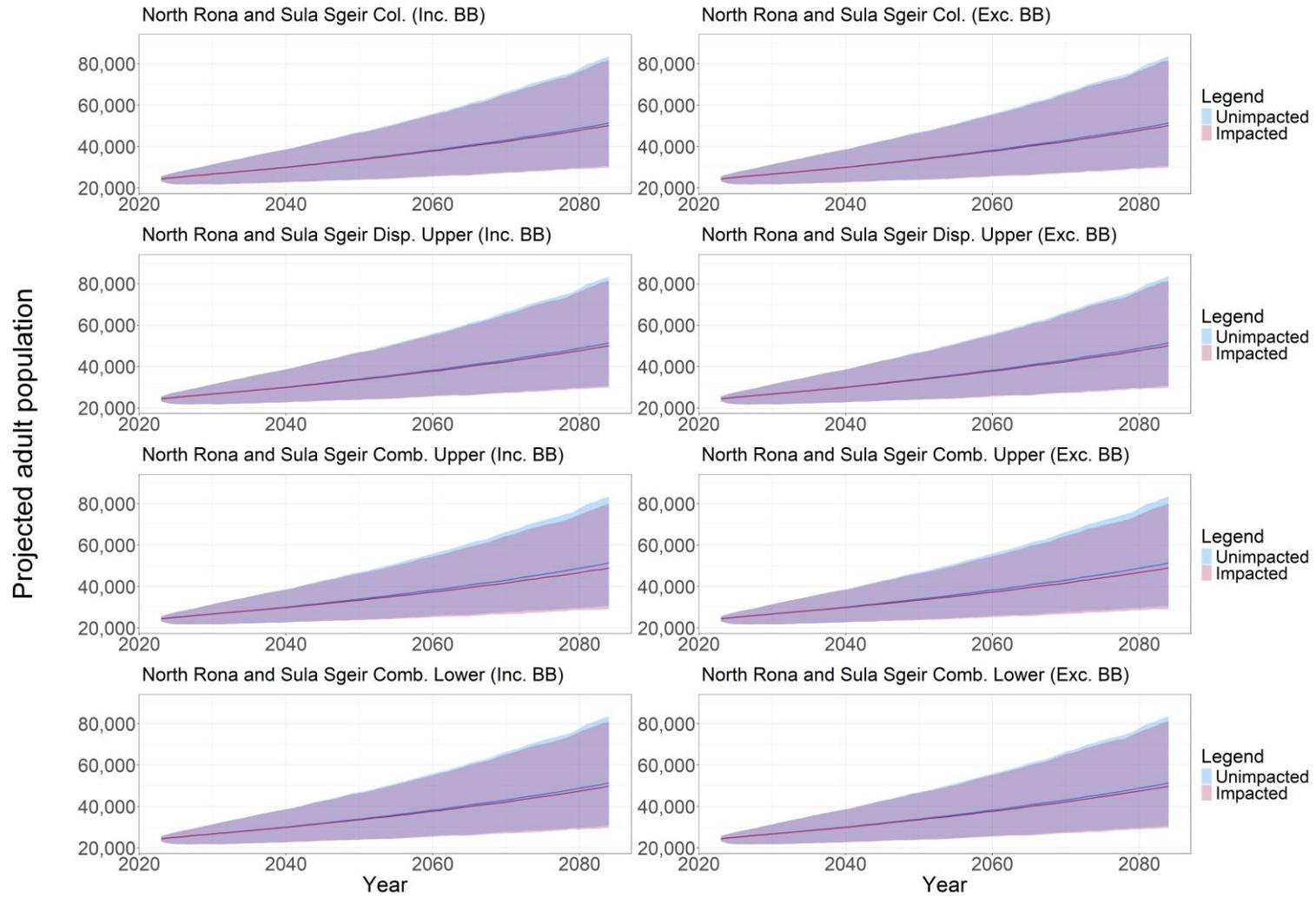


Plate 5-92 CGR after 35 Years for the Gannet Population at the North Rona and Sula Sgeir SPA.

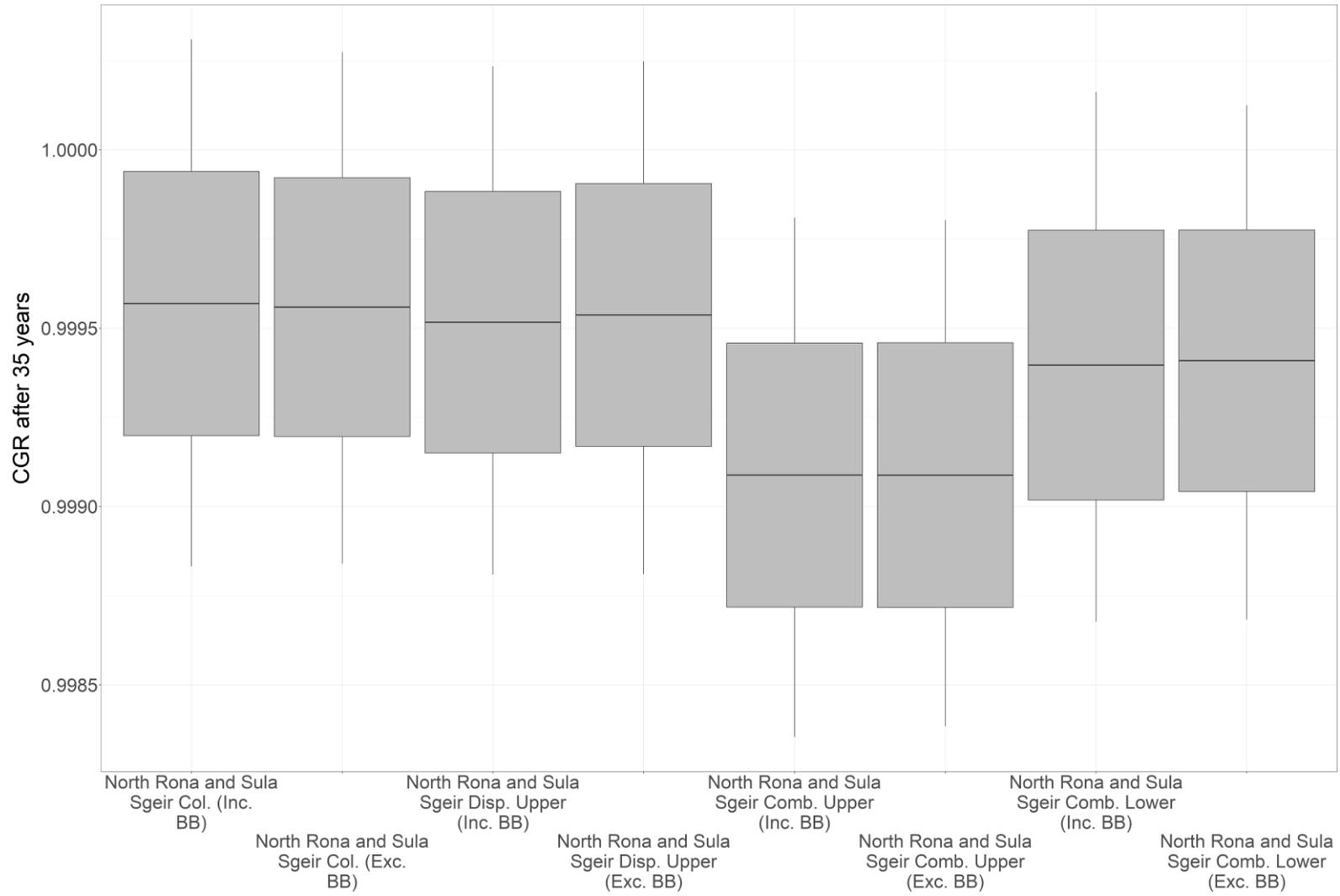


Plate 5-93 CPS after 35 Years for the Gannet Population at the North Rona and Sula Sgeir SPA.

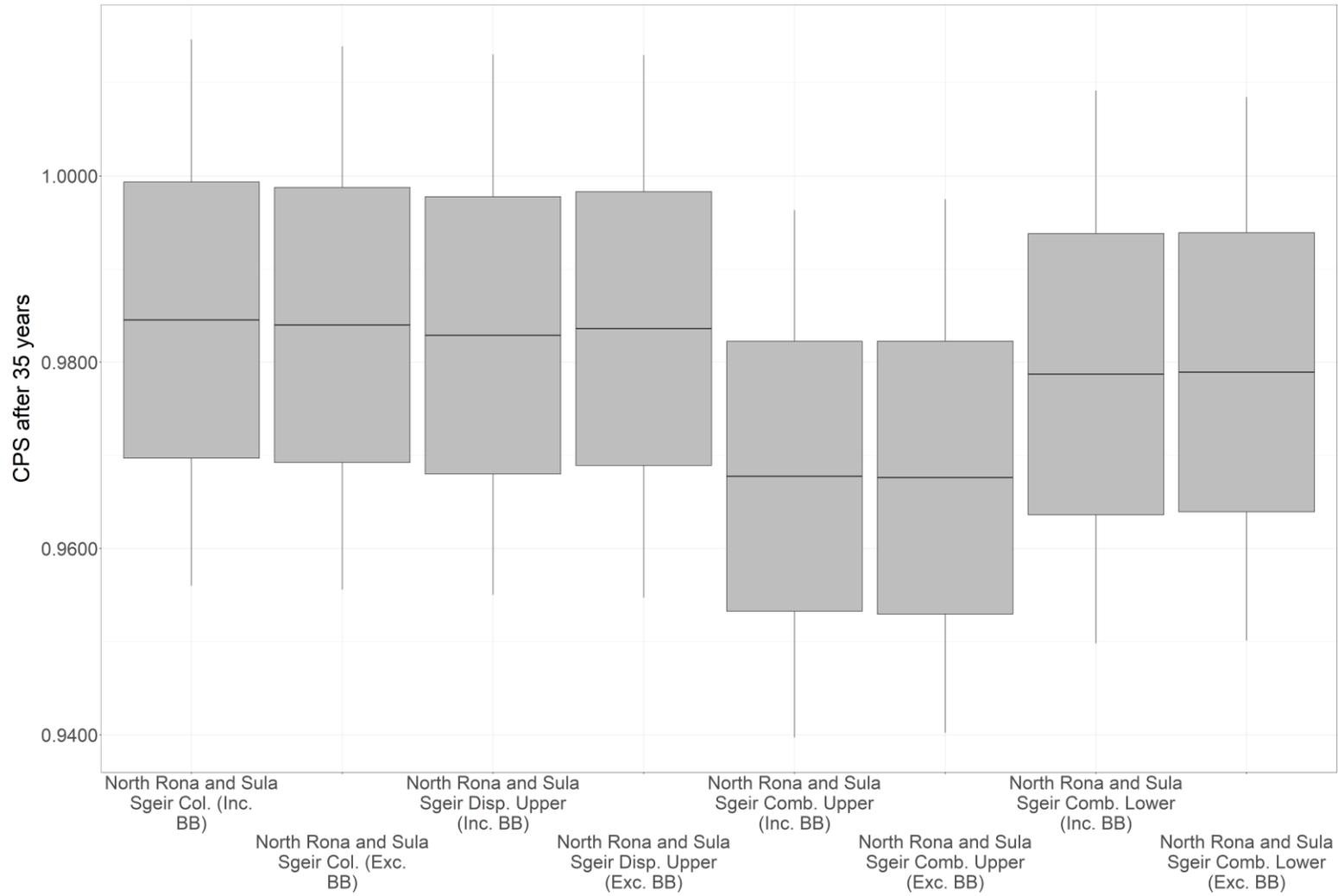


Plate 5-94 Gannet Population Projections over 35-50 Years at the Noss SPA.

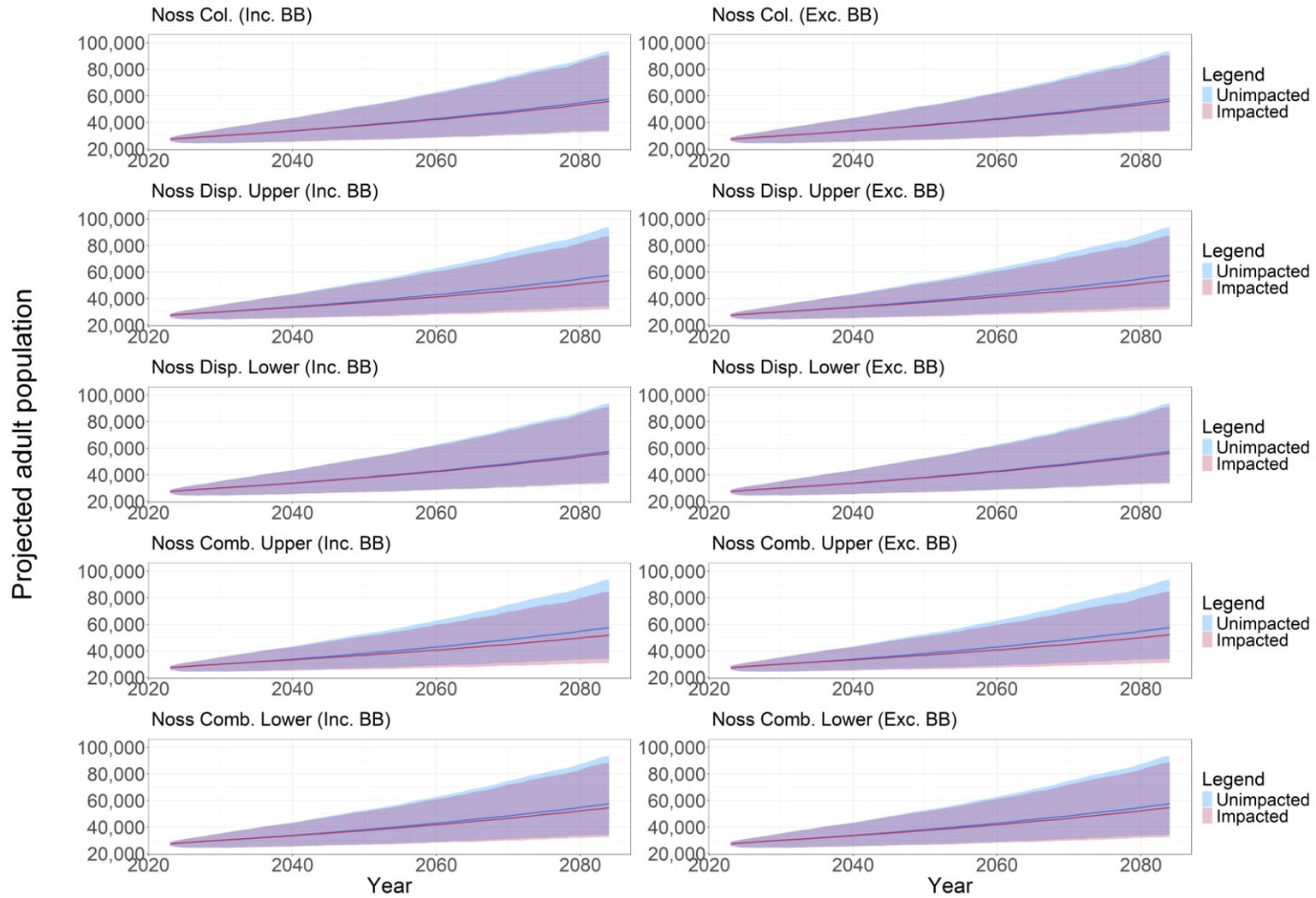


Plate 5-95 CGR after 35 Years for the Gannet Population at the Noss SPA.

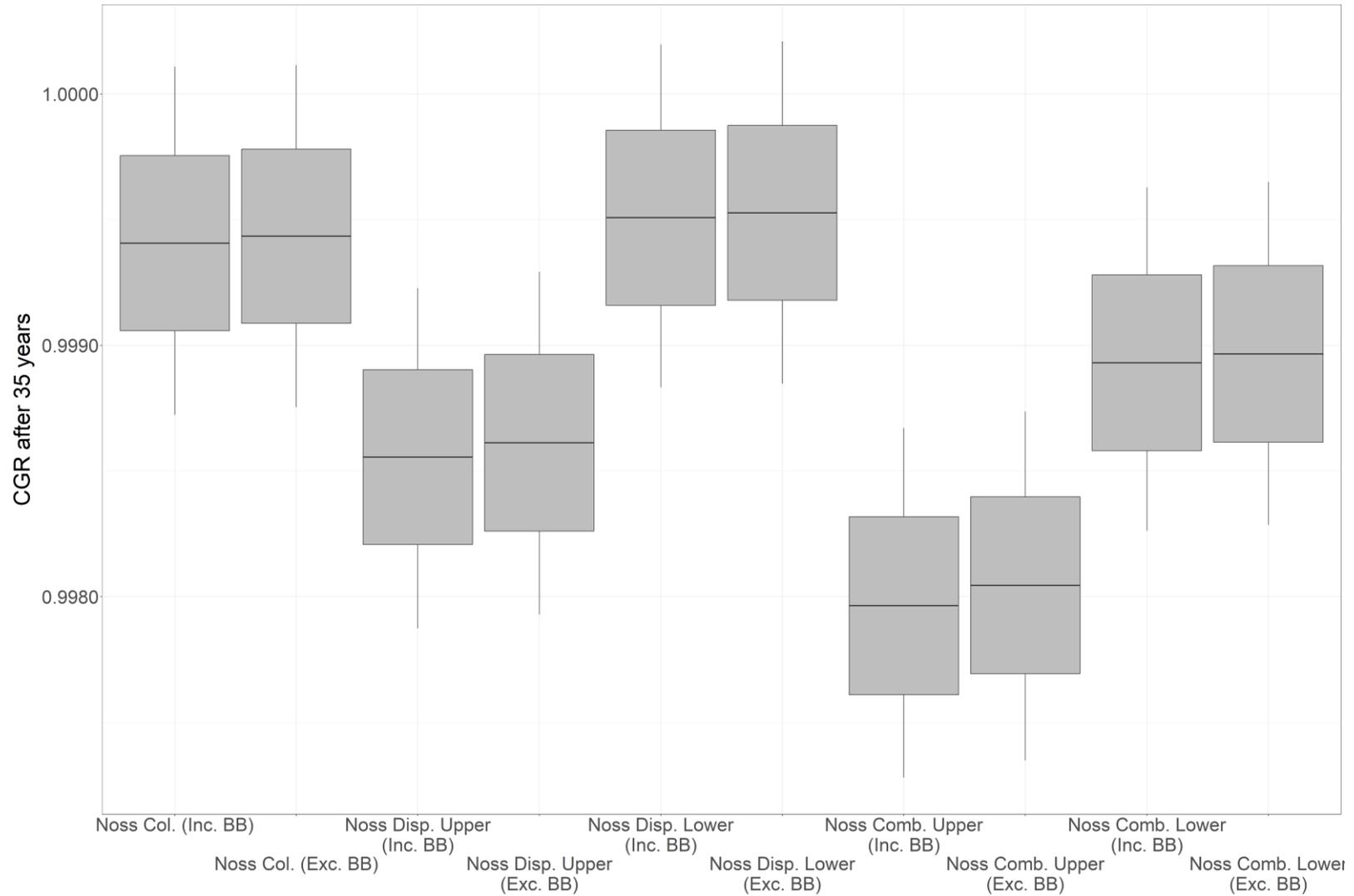


Plate 5-96 CPS after 35 Years for the Gannet Population at the Noss SPA.

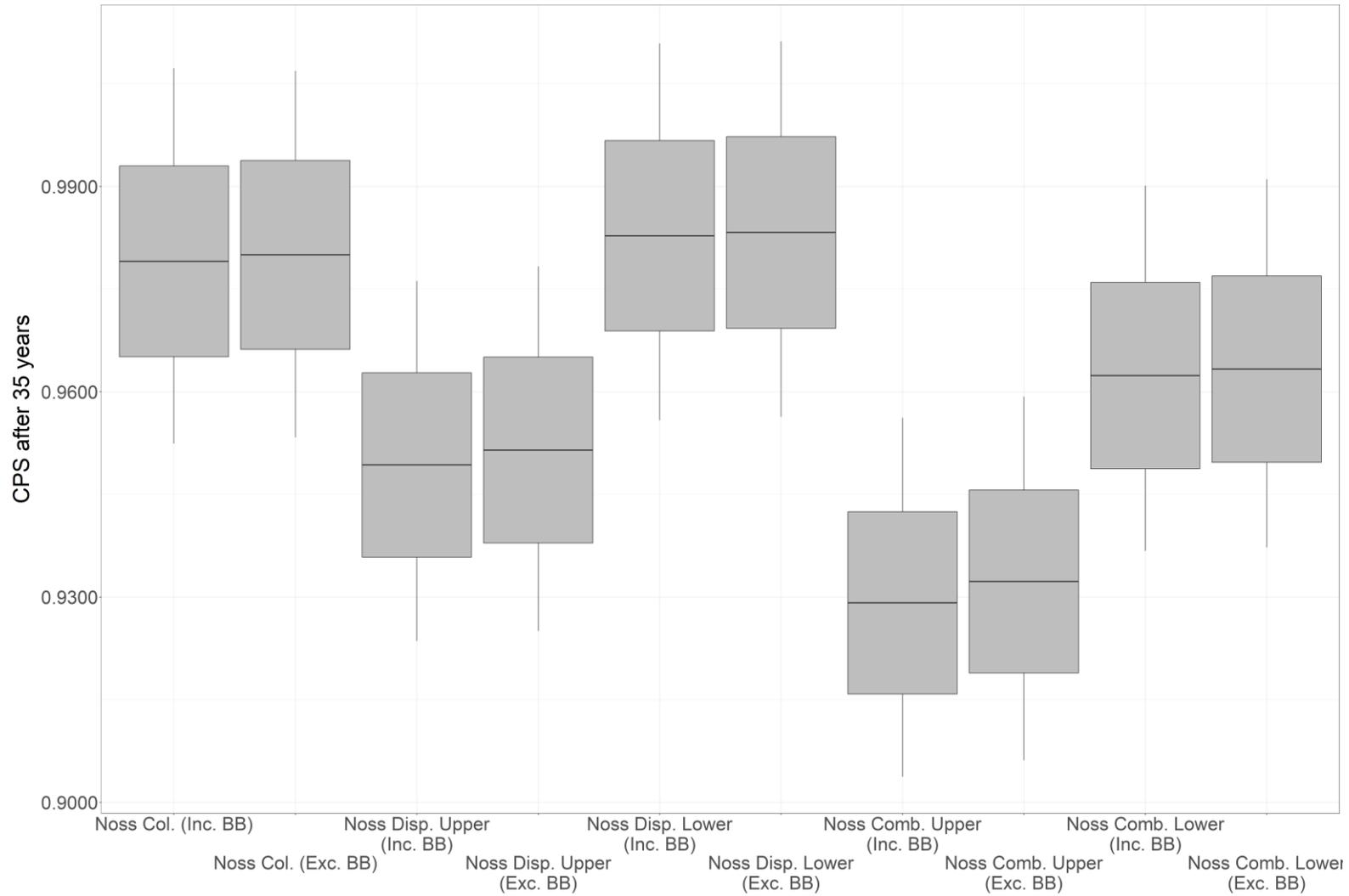


Plate 5-97 Gannet Population Projections over 35-50 Years at the St Kilda SPA.

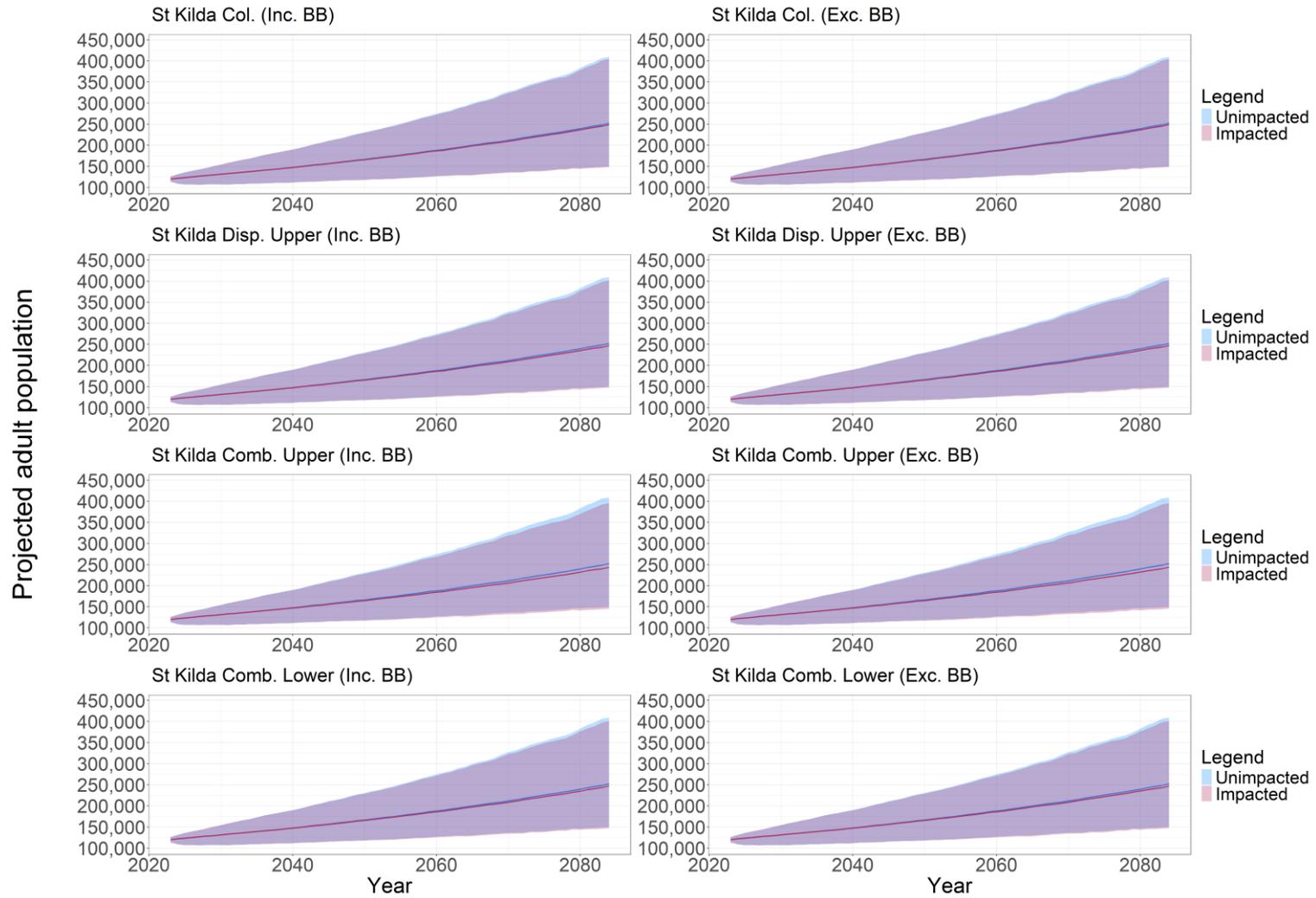


Plate 5-98 CGR after 35 Years for the Gannet Population at the St Kilda SPA.

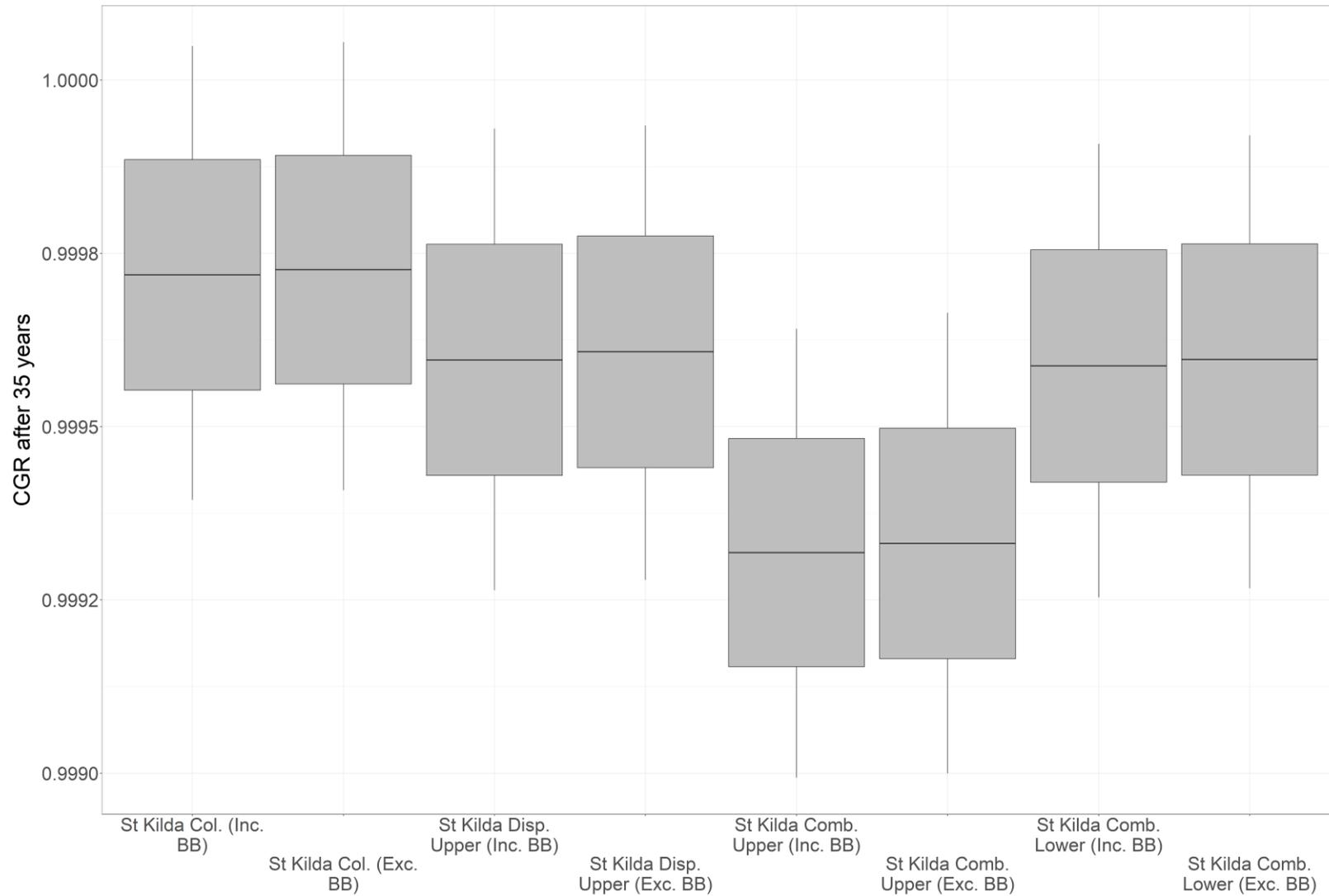


Plate 5-99 CPS after 35 Years for the Gannet Population at the St Kilda SPA.

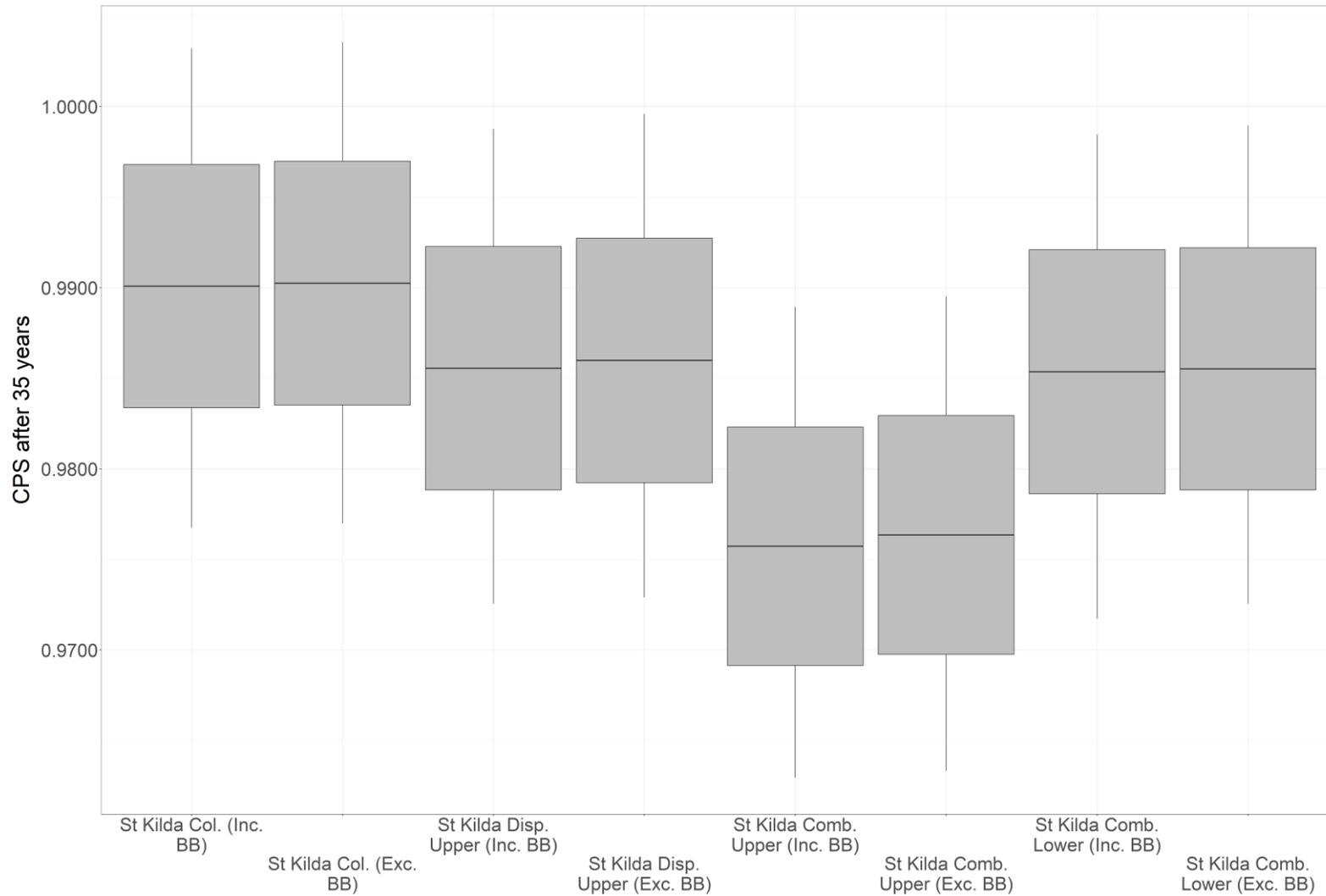


Plate 5-100 Gannet Population Projections over 35-50 Years at the Sule Skerry and Sule Stack SPA.

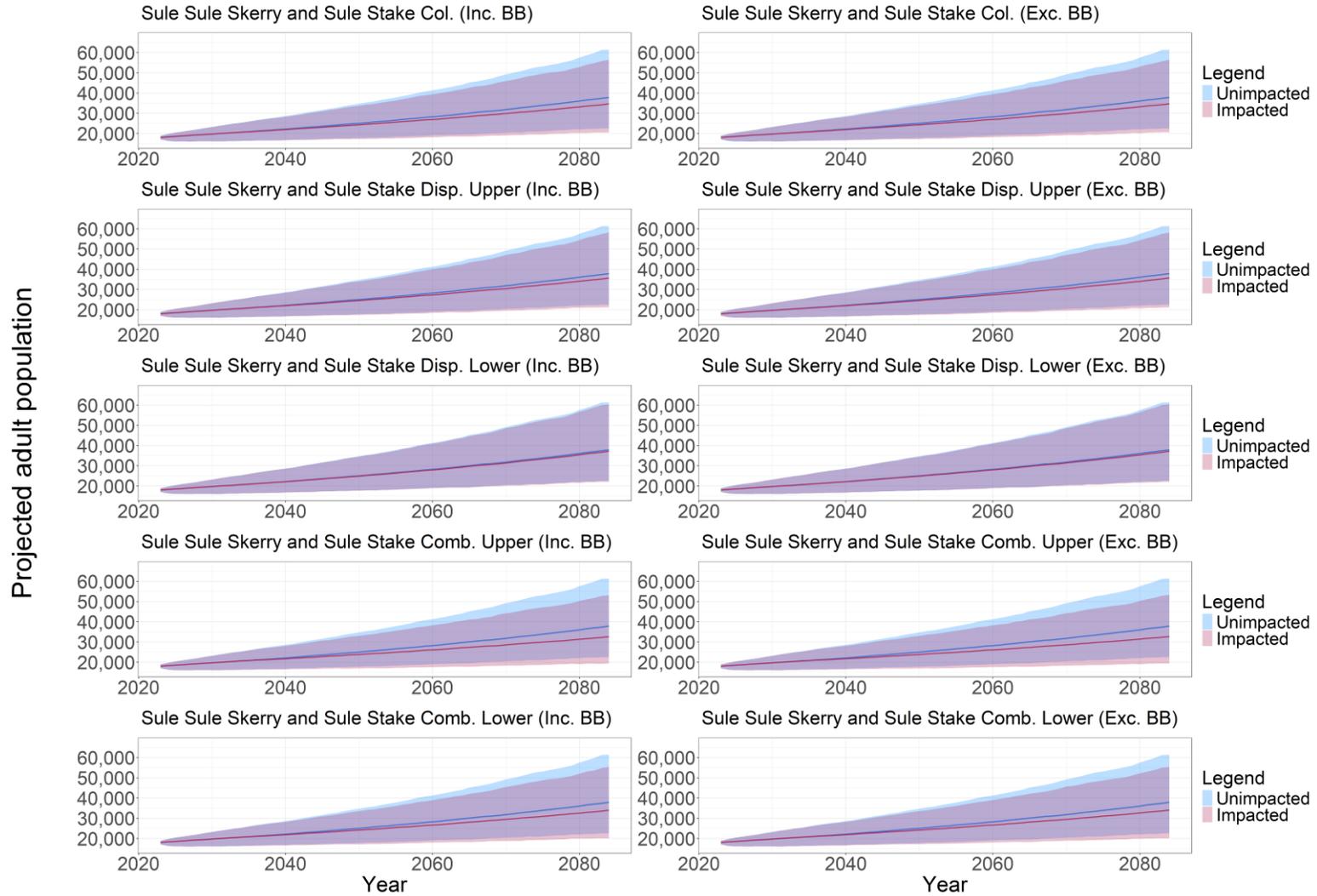


Plate 5-101 CGR after 35 Years for the Gannet Population at the Sule Skerry and Sule Stack SPA.

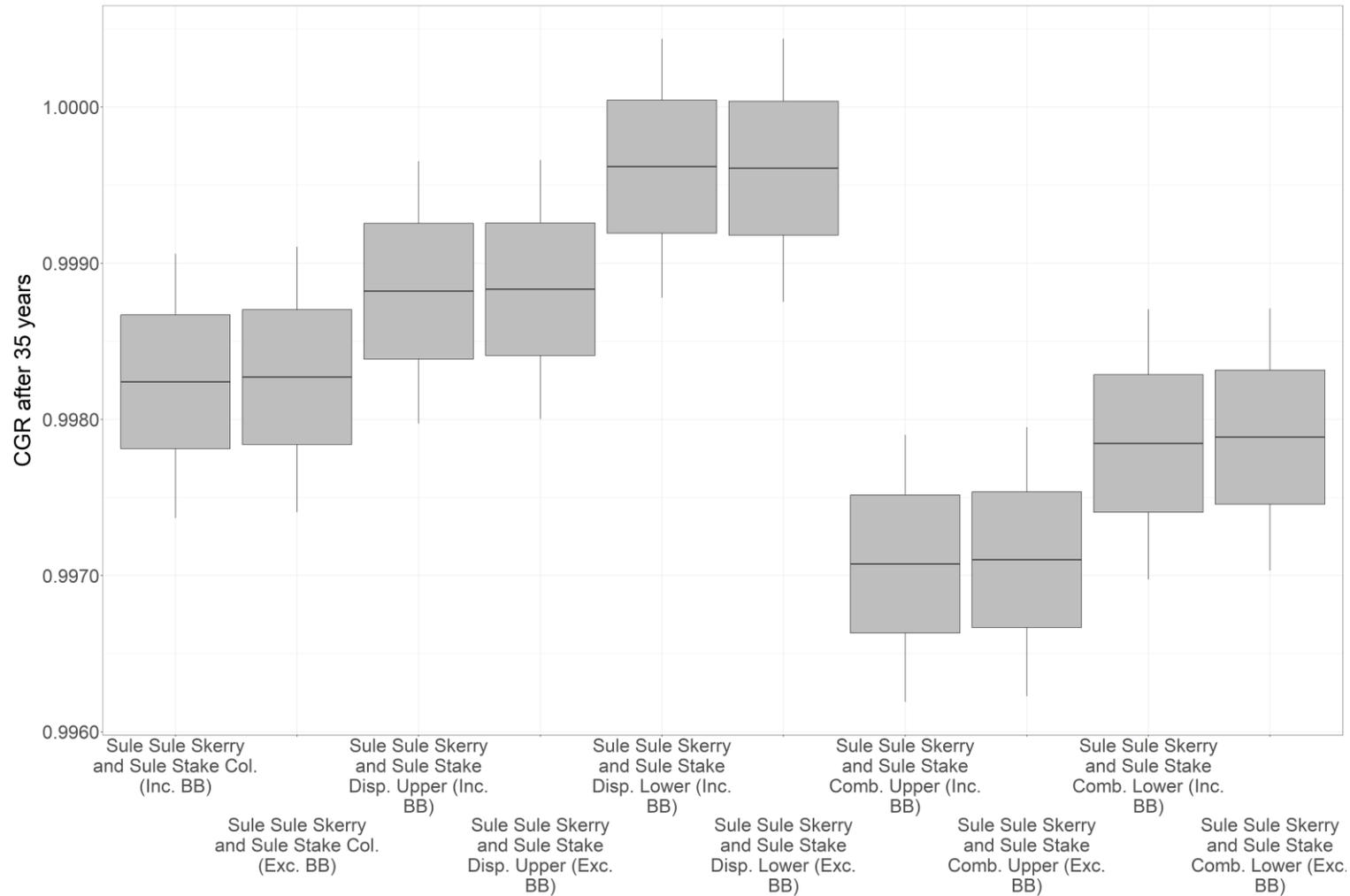
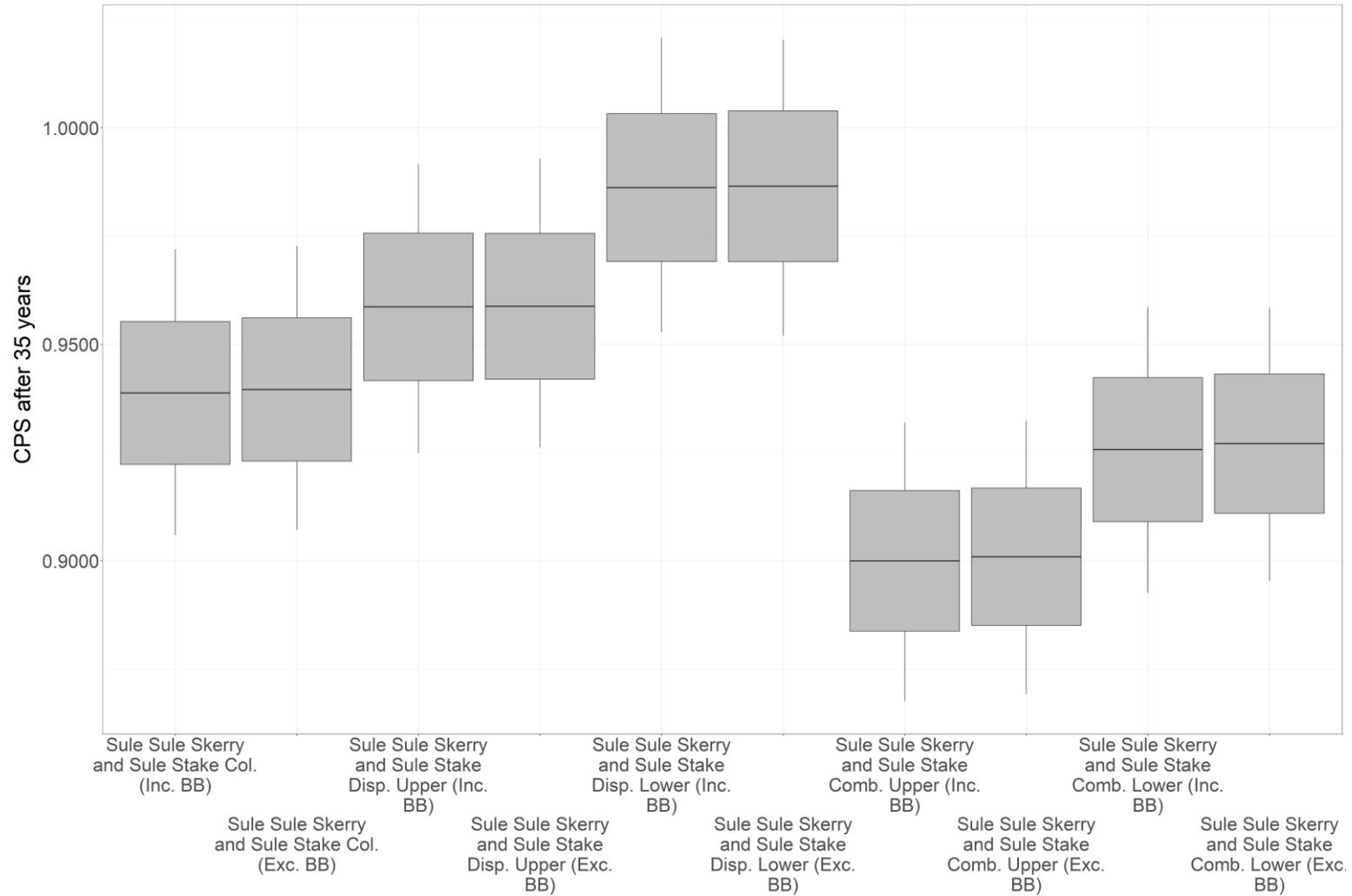


Plate 5-102 CPS after 35 Years for the Gannet Population at the Sule Skerry and Sule Stack SPA.





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5.3 RESULTS: AFTER 50 YEARS

5.3.1 KITTIWAKE

- 5.3.1.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the kittiwake populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 5-7**.
- 5.3.1.2 Graphical representation of the population projections up to 50 years are presented within Section 5.2 and not repeated here.

Table 5-7 Offshore Project In-combination PVA Outputs for Kittiwake After 50 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|----------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 1.0026 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 11.63 | 1.0007 | 0.9981 | 0.9077 | 0.19 | 9.23 | 42.46 | 57.06 |
| | Collision only (without Berwick Bank) | 11.55 | 1.0006 | 0.9981 | 0.9077 | 0.19 | 9.23 | 41.90 | 57.48 |
| | Displacement NatureScot Upper (30/3) (with Berwick Bank) | 5.01 | 1.0017 | 0.9992 | 0.9591 | 0.08 | 4.09 | 46.98 | 53.42 |
| | Displacement NatureScot Upper (30/3) (without Berwick Bank) | 4.95 | 1.0017 | 0.9992 | 0.9594 | 0.08 | 4.06 | 47.20 | 53.12 |
| | Displacement NatureScot Lower (30/1) and Applicant (with Berwick Bank) | 1.67 | 1.0023 | 0.9997 | 0.9861 | 0.03 | 1.39 | 49.22 | 51.08 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 1.65 | 1.0023 | 0.9997 | 0.9857 | 0.03 | 1.43 | 49.14 | 50.98 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 16.64 | 0.9999 | 0.9973 | 0.8704 | 0.27 | 12.96 | 39.10 | 60.20 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 16.50 | 0.9998 | 0.9973 | 0.8709 | 0.27 | 12.91 | 38.98 | 60.32 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 13.30 | 1.0004 | 0.9978 | 0.8956 | 0.22 | 10.44 | 41.00 | 58.76 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|---------------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 13.20 | 1.0005 | 0.9978 | 0.8959 | 0.22 | 10.41 | 41.40 | 58.42 |
| East Caithness Cliffs SPA | Baseline | 0 | 1.0026 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 205.75 | 0.9976 | 0.9950 | 0.7756 | 0.50 | 22.44 | 30.76 | 69.62 |
| | Displacement NatureScot Upper (30/3) | 139.27 | 0.9992 | 0.9966 | 0.8419 | 0.34 | 15.81 | 36.66 | 63.02 |
| | Displacement NatureScot Lower and Applicant (30/1) | 46.41 | 1.0015 | 0.9989 | 0.9443 | 0.11 | 5.57 | 45.38 | 54.38 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) | 345.01 | 0.9942 | 0.9917 | 0.6524 | 0.83 | 34.76 | 19.98 | 81.32 |
| | Combined Collisions and Displacement | 252.16 | 0.9965 | 0.9939 | 0.7320 | 0.61 | 26.80 | 26.16 | 73.68 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|---------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | NatureScot Lower and Applicant (30/1) | | | | | | | | |
| Flamborough and Filey Coast SPA | Baseline | 0 | 1.0026 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 435.64 | 0.9969 | 0.9943 | 0.7486 | 0.57 | 25.14 | 27.84 | 72.22 |
| | Displacement NatureScot Upper (30/3) | 285.95 | 0.9989 | 0.9963 | 0.8268 | 0.37 | 17.32 | 35.24 | 64.56 |
| | Displacement NatureScot Lower and Applicant (30/1) | 95.27 | 1.0013 | 0.9988 | 0.9387 | 0.12 | 6.13 | 44.94 | 54.72 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) | 721.59 | 0.9931 | 0.9906 | 0.6184 | 0.94 | 38.16 | 16.78 | 84.38 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) | 530.91 | 0.9956 | 0.9931 | 0.7022 | 0.69 | 29.78 | 23.74 | 76.50 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|----------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| North Caithness Cliffs SPA | Baseline | 0 | 1.0025 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 39.00 | 1.0008 | 0.9982 | 0.9137 | 0.18 | 8.63 | 43.18 | 57.18 |
| | Displacement NatureScot Upper (30/3) | 28.69 | 1.0013 | 0.9987 | 0.9359 | 0.13 | 6.41 | 44.92 | 55.32 |
| | Displacement NatureScot Lower and Applicant (30/1) | 9.56 | 1.0021 | 0.9996 | 0.9776 | 0.04 | 2.24 | 48.22 | 51.86 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) | 67.69 | 0.9995 | 0.9969 | 0.8554 | 0.31 | 14.46 | 38.26 | 61.92 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) | 48.56 | 1.0003 | 0.9978 | 0.8933 | 0.22 | 10.67 | 41.48 | 58.84 |
| | Baseline | 0 | 1.0026 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|---------------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| North Colonsay and Western Cliffs SPA | Collision only (with Berwick Bank) | 5.97 | 1.0015 | 0.9989 | 0.9473 | 0.11 | 5.27 | 45.98 | 54.48 |
| | Collision only (without Berwick Bank) | 5.16 | 1.0017 | 0.9991 | 0.9533 | 0.09 | 4.67 | 46.24 | 54.20 |
| | Displacement NatureScot Upper (30/3) (with Berwick Bank) | 2.41 | 1.0021 | 0.9995 | 0.9786 | 0.05 | 2.14 | 47.98 | 52.28 |
| | Displacement NatureScot Upper (30/3) (without Berwick Bank) | 2.01 | 1.0022 | 0.9996 | 0.9811 | 0.04 | 1.89 | 48.40 | 51.90 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 8.38 | 1.0010 | 0.9985 | 0.9269 | 0.15 | 7.31 | 44.14 | 56.36 |
| | Combined Collisions and Displacement | 7.17 | 1.0013 | 0.9987 | 0.9370 | 0.13 | 6.30 | 44.94 | 55.04 |
| | | | | | | | | | |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|--------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | NatureScot Upper (30/3) (without Berwick Bank) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 6.77 | 1.0013 | 0.9988 | 0.9413 | 0.12 | 5.87 | 45.40 | 55.30 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 5.83 | 1.0015 | 0.9990 | 0.9481 | 0.10 | 5.19 | 45.78 | 54.98 |
| Rathlin Island SPA | Baseline | 0 | 1.0025 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 8.86 | 1.0021 | 0.9996 | 0.9812 | 0.04 | 1.88 | 48.76 | 51.26 |
| | Collision only (without Berwick Bank) | 8.80 | 1.0022 | 0.9996 | 0.9807 | 0.04 | 1.93 | 48.60 | 51.24 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 12.40 | 1.0020 | 0.9995 | 0.9728 | 0.05 | 2.72 | 47.72 | 52.14 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 12.29 | 1.0020 | 0.9995 | 0.9735 | 0.05 | 2.65 | 48.04 | 52.12 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 10.04 | 1.0022 | 0.9996 | 0.9782 | 0.04 | 2.18 | 48.46 | 51.68 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 9.97 | 1.0021 | 0.9996 | 0.9785 | 0.04 | 2.15 | 48.44 | 51.48 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| West Westray SPA | Baseline | 0 | 1.0025 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 42.69 | 0.9933 | 0.9908 | 0.6248 | 0.92 | 37.52 | 17.38 | 83.70 |
| | Collision only (without Berwick Bank) | 37.28 | 0.9944 | 0.9920 | 0.6632 | 0.80 | 33.68 | 20.70 | 80.34 |
| | Displacement NatureScot Upper (30/3) (with Berwick Bank) | 32.72 | 0.9954 | 0.9930 | 0.6976 | 0.70 | 30.24 | 23.34 | 76.76 |
| | Displacement NatureScot Upper (30/3) (without Berwick Bank) | 28.11 | 0.9964 | 0.9939 | 0.7340 | 0.61 | 26.60 | 26.74 | 73.24 |
| | Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 10.91 | 1.0002 | 0.9977 | 0.8881 | 0.23 | 11.19 | 40.68 | 59.28 |
| | Displacement NatureScot Lower and Applicant (30/1) (without Berwick Bank) | 9.37 | 1.0005 | 0.9980 | 0.9025 | 0.20 | 9.75 | 42.18 | 58.14 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Applicant (30/1) (without Berwick Bank) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (with Berwick Bank) | 75.41 | 0.9863 | 0.9838 | 0.4341 | 1.62 | 56.59 | 4.72 | 96.32 |
| | Combined Collisions and Displacement NatureScot Upper (30/3) (without Berwick Bank) | 65.40 | 0.9884 | 0.9859 | 0.4850 | 1.41 | 51.50 | 7.06 | 93.12 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (30/1) (with Berwick Bank) | 53.60 | 0.9909 | 0.9885 | 0.5533 | 1.15 | 44.67 | 11.72 | 88.94 |
| | Combined Collisions and Displacement NatureScot Lower and | 46.66 | 0.9925 | 0.9900 | 0.5988 | 1.00 | 40.12 | 15.08 | 85.40 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Applicant (30/1) (without Berwick Bank) | | | | | | | | |



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5.3.2 GUILLEMOT

- 5.3.2.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the guillemot populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 5-8**.
- 5.3.2.2 Graphical representation of the population projections up to 50 years are presented within Section 5.2 and not repeated here.

Table 5-8 Offshore Project In-combination PVA Outputs for Guillemot After 50 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 19.70 | 1.0256 | 0.9996 | 0.9782 | 0.04 | 2.18 | 45.3 | 54.14 |
| Flannan Isles SPA | Baseline | 0 | 1.0260 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 2.27 | 1.0257 | 0.9997 | 0.9829 | 0.03 | 1.71 | 46.42 | 53.44 |
| Handa SPA | Baseline | 0 | 1.0260 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 29.73 | 1.0256 | 0.9995 | 0.9771 | 0.05 | 2.29 | 45.34 | 54.46 |
| North Rona and Sula Sgeir SPA | Baseline | 0 | 1.0261 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 3.29 | 1.0257 | 0.9996 | 0.9821 | 0.04 | 1.79 | 46.46 | 53.5 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|--------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Sule Skerry and Sule Stack SPA | Baseline | 0 | 1.0260 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) | 15.47 | 1.0246 | 0.9986 | 0.9294 | 0.14 | 7.06 | 35.46 | 64.72 |
| | Displacement NatureScot Lower (60/3/1) | 5.56 | 1.0255 | 0.9995 | 0.9737 | 0.05 | 2.63 | 45.02 | 55.62 |
| | Displacement Applicant (50/1/1) | 4.13 | 1.0257 | 0.9996 | 0.981 | 0.04 | 1.9 | 46.04 | 53.88 |

5.3.3 RAZORBILL

- 5.3.3.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the razorbill populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 5-9**.
- 5.3.3.2 Graphical representation of the population projections up to 50 years are presented within Section 5.2 and not repeated here.

Table 5-9 Offshore Project In-combination PVA Outputs for Razorbill After 50 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|----------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 0.9764 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 5.94 | 0.9749 | 0.9984 | 0.9213 | 0.16 | 7.87 | 42.62 | 57.62 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 5.85 | 0.9749 | 0.9984 | 0.9206 | 0.16 | 7.94 | 42.44 | 57.54 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 2.45 | 0.9757 | 0.9993 | 0.9639 | 0.07 | 3.61 | 46.62 | 53.44 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 2.42 | 0.9758 | 0.9993 | 0.9666 | 0.07 | 3.34 | 46.90 | 53.58 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| SPA | Displacement Applicant (50/1/1) (with Berwick Bank) | 1.45 | 0.9761 | 0.9996 | 0.9797 | 0.04 | 2.03 | 47.84 | 52.32 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 1.43 | 0.9760 | 0.9996 | 0.9787 | 0.04 | 2.13 | 48.20 | 52.06 |
| Flannan Isles SPA | Baseline | 0 | 0.9764 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 2.94 | 0.9742 | 0.9977 | 0.8894 | 0.23 | 11.06 | 39.98 | 60.26 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 2.90 | 0.9742 | 0.9977 | 0.8911 | 0.23 | 10.89 | 40.26 | 59.84 |
| | Displacement NatureScot Lower | 1.21 | 0.9755 | 0.9991 | 0.9526 | 0.09 | 4.74 | 46.18 | 54.18 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (60/3/1) (with Berwick Bank) | | | | | | | | |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 1.19 | 0.9755 | 0.9990 | 0.9484 | 0.10 | 5.16 | 46.18 | 54.32 |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 0.72 | 0.9758 | 0.9994 | 0.9688 | 0.06 | 3.12 | 47.12 | 52.66 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 0.71 | 0.9758 | 0.9994 | 0.9659 | 0.06 | 3.41 | 46.70 | 53.54 |
| Handa SPA | Baseline | 0 | 0.9765 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 13.61 | 0.9750 | 0.9985 | 0.9278 | 0.15 | 7.22 | 42.98 | 56.88 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 13.39 | 0.9751 | 0.9986 | 0.9302 | 0.14 | 6.98 | 43.34 | 56.48 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 5.42 | 0.9758 | 0.9994 | 0.9710 | 0.06 | 2.90 | 47.60 | 52.40 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 5.35 | 0.9759 | 0.9994 | 0.9715 | 0.06 | 2.85 | 47.08 | 52.66 |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 3.41 | 0.9760 | 0.9996 | 0.9827 | 0.04 | 1.73 | 48.14 | 51.64 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 3.35 | 0.9761 | 0.9997 | 0.9817 | 0.03 | 1.83 | 48.38 | 51.42 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|---------------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Mingulay and Berneray SPA | Baseline | 0 | 0.9764 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 20.14 | 0.9757 | 0.9991 | 0.9558 | 0.09 | 4.42 | 45.80 | 54.34 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 19.71 | 0.9756 | 0.9991 | 0.9566 | 0.09 | 4.34 | 46.12 | 54.18 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 6.71 | 0.9761 | 0.9997 | 0.9849 | 0.03 | 1.51 | 48.52 | 51.30 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 6.60 | 0.9762 | 0.9997 | 0.9843 | 0.03 | 1.57 | 48.20 | 51.58 |
| Rathlin Island SPA | Baseline | 0 | 0.9765 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 25.38 | 0.9755 | 0.9990 | 0.9496 | 0.10 | 5.04 | 45.08 | 55.12 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 24.89 | 0.9755 | 0.9990 | 0.9515 | 0.10 | 4.85 | 45.16 | 55.00 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 8.47 | 0.9762 | 0.9997 | 0.9833 | 0.03 | 1.67 | 48.26 | 51.74 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 8.31 | 0.9762 | 0.9997 | 0.9834 | 0.03 | 1.66 | 48.52 | 51.68 |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 7.05 | 0.9762 | 0.9997 | 0.9861 | 0.03 | 1.39 | 48.80 | 51.50 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 6.91 | 0.9762 | 0.9997 | 0.9862 | 0.03 | 1.38 | 48.80 | 51.26 |
| Shiant Isles SPA | Baseline | 0 | 0.9765 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 10.54 | 0.9753 | 0.9988 | 0.9418 | 0.12 | 5.82 | 44.32 | 55.28 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 10.36 | 0.9754 | 0.9989 | 0.9440 | 0.11 | 5.60 | 44.68 | 55.12 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 4.07 | 0.9761 | 0.9995 | 0.9771 | 0.05 | 2.29 | 48.04 | 51.74 |
| | Displacement NatureScot Lower | 4.01 | 0.9760 | 0.9996 | 0.9785 | 0.04 | 2.15 | 48.12 | 51.66 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|---|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (60/3/1) (without Berwick Bank) | | | | | | | | |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 2.70 | 0.9761 | 0.9997 | 0.9857 | 0.03 | 1.43 | 48.48 | 51.02 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 2.65 | 0.9761 | 0.9997 | 0.9865 | 0.03 | 1.35 | 48.94 | 51.02 |
| Skomer, Skokholm and the Seas off Pembrokeshire SPA | Baseline | 0 | 0.9765 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 13.19 | 0.9755 | 0.9990 | 0.9523 | 0.10 | 4.77 | 45.80 | 54.60 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 13.01 | 0.9755 | 0.9990 | 0.9513 | 0.10 | 4.87 | 45.68 | 54.36 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|--------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| SPA | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 5.42 | 0.9761 | 0.9996 | 0.9801 | 0.04 | 1.99 | 48.26 | 51.68 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 5.35 | 0.9761 | 0.9996 | 0.9798 | 0.04 | 2.02 | 47.86 | 51.98 |
| St Kilda SPA | Baseline | 0 | 0.9764 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 3.48 | 0.9727 | 0.9962 | 0.8243 | 0.38 | 17.57 | 33.36 | 65.90 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 3.41 | 0.9727 | 0.9962 | 0.8268 | 0.38 | 17.32 | 33.36 | 65.92 |
| | Displacement NatureScot Lower | 1.19 | 0.9751 | 0.9987 | 0.9309 | 0.13 | 6.91 | 44.34 | 55.62 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 35 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (60/3/1) (with Berwick Bank) | | | | | | | | |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 1.16 | 0.9750 | 0.9987 | 0.9368 | 0.13 | 6.32 | 44.02 | 55.94 |
| | Displacement Applicant (50/1/1) (with Berwick Bank) | 0.96 | 0.9753 | 0.9991 | 0.9504 | 0.09 | 4.96 | 45.36 | 54.22 |
| | Displacement Applicant (50/1/1) (without Berwick Bank) | 0.94 | 0.9752 | 0.9990 | 0.9478 | 0.10 | 5.22 | 45.94 | 54.04 |

5.3.4 PUFFIN

- 5.3.4.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the puffin populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 5-10**.
- 5.3.4.2 Graphical representation of the population projections up to 50 years are presented within Section 5.2 and not repeated here.

Table 5-10 Offshore Project In-combination PVA Outputs for Puffin After 50 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|----------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Cape Wrath SPA | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 3.46 | 0.9712 | 0.9991 | 0.9547 | 0.09 | 4.53 | 47.36 | 52.74 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 3.46 | 0.9711 | 0.9991 | 0.9539 | 0.09 | 4.61 | 47.18 | 53.12 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 2.04 | 0.9715 | 0.9995 | 0.9731 | 0.05 | 2.69 | 48.50 | 51.78 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 2.04 | 0.9714 | 0.9995 | 0.9734 | 0.05 | 2.66 | 48.42 | 51.52 |
| | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Flannan Isles SPA | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 38.37 | 0.9716 | 0.9995 | 0.9765 | 0.05 | 2.35 | 48.44 | 51.74 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 38.35 | 0.9716 | 0.9995 | 0.9769 | 0.05 | 2.31 | 48.74 | 51.60 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 22.69 | 0.9717 | 0.9997 | 0.9857 | 0.03 | 1.43 | 49.00 | 51.02 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 22.68 | 0.9717 | 0.9997 | 0.9859 | 0.03 | 1.41 | 48.98 | 51.04 |
| Shiant Isles SPA | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot Upper | 35.86 | 0.9717 | 0.9997 | 0.9837 | 0.03 | 1.63 | 48.98 | 51.38 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|--------------------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (60/5/3) (with Berwick Bank) | | | | | | | | |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 35.77 | 0.9717 | 0.9997 | 0.9835 | 0.03 | 1.65 | 48.92 | 51.36 |
| | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |
| St Kilda SPA | Displacement NatureScot Upper (60/5/3) (with Berwick Bank) | 50.87 | 0.9717 | 0.9997 | 0.9849 | 0.03 | 1.51 | 48.88 | 51.10 |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 50.67 | 0.9717 | 0.9997 | 0.9847 | 0.03 | 1.53 | 48.88 | 51.10 |
| | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |
| Sule Skerry and Sule Stack SPA | Displacement NatureScot Upper | 109.83 | 0.9707 | 0.9987 | 0.9336 | 0.13 | 6.64 | 45.16 | 54.60 |
| | Baseline | 0 | 0.9720 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (60/5/3) (with Berwick Bank) | | | | | | | | |
| | Displacement NatureScot Upper (60/5/3) (without Berwick Bank) | 109.75 | 0.9707 | 0.9986 | 0.9329 | 0.14 | 6.71 | 45.16 | 54.60 |
| | Displacement NatureScot Lower (60/3/1) (with Berwick Bank) | 64.63 | 0.9712 | 0.9992 | 0.9600 | 0.08 | 4.00 | 46.96 | 52.88 |
| | Displacement NatureScot Lower (60/3/1) (without Berwick Bank) | 64.61 | 0.9712 | 0.9992 | 0.9598 | 0.08 | 4.02 | 46.88 | 52.82 |

5.3.5 RED-THROATED DIVER

- 5.3.5.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the red-throated diver populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 5-11**.
- 5.3.5.2 Graphical representation of the population projections up to 50 years are presented within Section 5.2 and not repeated here.

Table 5-11 Offshore Project In-combination PVA Outputs for Red-throated Diver After 50 Years

| SPA | Impact Scenario | Predicted Annual Mortality (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|---------------------|--|--|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Lewis Peatlands SPA | Baseline | 0 | 0.9704 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Displacement NatureScot and Applicant (100/10) | 0.83 | 0.9640 | 0.9923 | 0.6800 | 0.77 | 32.00 | 39.36 | 65.20 |

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5.3.6 GANNET

- 5.3.6.1 The results of the PVA runs for impacts from the Offshore Project in-combination with other plans and projects to the gannet populations (as set out in **Table 3-2**) at the first full year of the operation and maintenance phase (2034) and for a 50 year timespan are presented in **Table 5-12**.
- 5.3.6.2 Graphical representation of the population projections up to 50 years are presented within Section 5.2 and not repeated here.

Table 5-12 Offshore Project In-combination PVA Outputs for Gannet After 50 Years

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Ailsa Craig SPA | Baseline | 0 | 1.0124 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 33.88 | 1.0117 | 0.9994 | 0.9787 | 0.06 | 2.13 | 45.48 | 54.16 |
| | Collision only (without Berwick Bank) | 32.24 | 1.0117 | 0.9994 | 0.9796 | 0.06 | 2.04 | 45.92 | 53.74 |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 42.72 | 1.0115 | 0.9992 | 0.9732 | 0.08 | 2.68 | 44.36 | 55.16 |
| | Displacement NatureScot Upper (70/3) | 41.24 | 1.0115 | 0.9993 | 0.974 | 0.07 | 2.60 | 44.62 | 54.78 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (without Berwick Bank) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 14.24 | 1.0121 | 0.9998 | 0.991 | 0.02 | 0.90 | 47.86 | 51.74 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 13.75 | 1.0121 | 0.9998 | 0.9915 | 0.02 | 0.85 | 48.22 | 51.72 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 76.60 | 1.0109 | 0.9986 | 0.9524 | 0.14 | 4.76 | 40.98 | 58.66 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 73.48 | 1.011 | 0.9987 | 0.9543 | 0.13 | 4.57 | 40.98 | 58.4 |
| | Baseline | 0 | 1.0124 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| Forth Islands SPA | Collision only | 431.31 | 1.0089 | 0.9966 | 0.8854 | 0.34 | 11.46 | 28.76 | 69.98 |
| | Displacement NatureScot Upper (70/3) | 335.88 | 1.0097 | 0.9974 | 0.9094 | 0.26 | 9.06 | 33.08 | 65.78 |
| | Displacement NatureScot Lower and Applicant (70/1) | 111.96 | 1.0115 | 0.9991 | 0.9691 | 0.09 | 3.09 | 43.90 | 55.94 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) | 767.19 | 1.0062 | 0.994 | 0.805 | 0.60 | 19.50 | 15.74 | 83.56 |
| | Combined Collisions and | 543.27 | 1.008 | 0.9957 | 0.8577 | 0.43 | 14.23 | 23.82 | 74.94 |
| | | | | | | | | | |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|---------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Lower and Applicant (70/1) | | | | | | | | |
| Grassholm SPA | Baseline | 0 | 1.0124 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 22.54 | 1.0119 | 0.9996 | 0.9866 | 0.04 | 1.34 | 47.72 | 52.3 |
| | Displacement NatureScot Upper (70/3) | 31.14 | 1.0118 | 0.9995 | 0.9816 | 0.05 | 1.84 | 46.32 | 53.28 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) | 53.68 | 1.0115 | 0.9991 | 0.9687 | 0.09 | 3.13 | 43.56 | 55.82 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|--|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 32.92 | 1.0118 | 0.9995 | 0.9808 | 0.05 | 1.92 | 46.1 | 53.72 |
| Hermaness, Saxa Vord and Valla Field SPA | Baseline | 0 | 1.0124 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only | 22.01 | 1.0119 | 0.9996 | 0.9842 | 0.04 | 1.58 | 47.14 | 53.22 |
| | Displacement NatureScot Upper (70/3) | 76.02 | 1.0108 | 0.9985 | 0.9468 | 0.15 | 5.32 | 39.56 | 59.78 |
| | Displacement NatureScot Lower and | 25.34 | 1.0118 | 0.9995 | 0.9819 | 0.05 | 1.81 | 46.52 | 53.54 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Applicant (70/1) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Upper (70/3) | 98.03 | 1.0104 | 0.998 | 0.9318 | 0.20 | 6.82 | 36.92 | 62.10 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) | 47.35 | 1.0114 | 0.9991 | 0.9662 | 0.09 | 3.38 | 43.90 | 56.38 |
| | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-------------------------------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| North Rona and Sula Sgeir SPA | Collision only (with Berwick Bank) | 9.16 | 1.0119 | 0.9996 | 0.9844 | 0.04 | 1.56 | 47.32 | 53.1 |
| | Collision only (without Berwick Bank) | 9.14 | 1.0119 | 0.9996 | 0.9842 | 0.04 | 1.58 | 47.36 | 53.2 |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 10.00 | 1.0118 | 0.9995 | 0.9826 | 0.05 | 1.74 | 46.56 | 53.26 |
| | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 9.77 | 1.0118 | 0.9995 | 0.983 | 0.05 | 1.70 | 46.68 | 53.32 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 19.16 | 1.0114 | 0.9991 | 0.9672 | 0.09 | 3.28 | 43.72 | 56.28 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (without Berwick Bank) | 18.91 | 1.0114 | 0.9991 | 0.9676 | 0.09 | 3.24 | 43.72 | 55.94 |
| | Combined Collisions and Displacement | 12.49 | 1.0117 | 0.9994 | 0.9784 | 0.06 | 2.16 | 46.02 | 54.10 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|----------|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | NatureScot Lower and Applicant (70/1) (with Berwick Bank) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 12.40 | 1.0117 | 0.9994 | 0.9788 | 0.06 | 2.12 | 45.90 | 54.00 |
| | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| Noss SPA | Collision only (with Berwick Bank) | 13.70 | 1.0117 | 0.9994 | 0.979 | 0.06 | 2.10 | 46.14 | 54.20 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Collision only (without Berwick Bank) | 13.16 | 1.0117 | 0.9994 | 0.9797 | 0.06 | 2.03 | 46.30 | 53.82 |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 33.75 | 1.0109 | 0.9986 | 0.9494 | 0.14 | 5.06 | 40.16 | 58.92 |
| | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 32.26 | 1.0109 | 0.9986 | 0.9518 | 0.14 | 4.82 | 40.72 | 58.74 |
| | Displacement NatureScot Lower and Applicant | 11.25 | 1.0118 | 0.9995 | 0.9828 | 0.05 | 1.72 | 46.78 | 53.18 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (70/1) (with Berwick Bank) | | | | | | | | |
| | Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 10.75 | 1.0119 | 0.9995 | 0.9835 | 0.05 | 1.65 | 46.9 | 52.98 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 47.45 | 1.0103 | 0.998 | 0.9295 | 0.2 | 7.05 | 36.5 | 62.44 |
| | Combined Collisions and | 45.56 | 1.0104 | 0.9981 | 0.9325 | 0.19 | 6.75 | 37.28 | 62.18 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Upper (70/3) (without Berwick Bank) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 24.95 | 1.0113 | 0.9989 | 0.9624 | 0.11 | 3.76 | 42.62 | 56.98 |
| | Combined Collisions and Displacement NatureScot Lower and | 23.91 | 1.0113 | 0.999 | 0.9639 | 0.10 | 3.61 | 42.54 | 56.52 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|--------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Applicant (70/1) (without Berwick Bank) | | | | | | | | |
| St Kilda SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 29.56 | 1.012 | 0.9997 | 0.9884 | 0.03 | 1.16 | 47.78 | 52.14 |
| | Collision only (without Berwick Bank) | 29.22 | 1.012 | 0.9997 | 0.9889 | 0.03 | 1.11 | 47.96 | 52.04 |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 42.72 | 1.0119 | 0.9996 | 0.985 | 0.04 | 1.50 | 46.92 | 52.92 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Upper (70/3) (without Berwick Bank) | 41.24 | 1.0119 | 0.9996 | 0.9856 | 0.04 | 1.44 | 46.98 | 52.76 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) (with Berwick Bank) | 71.91 | 1.0116 | 0.9993 | 0.9737 | 0.07 | 2.63 | 44.70 | 54.96 |
| | Combined Collisions and Displacement NatureScot Upper (70/3) | 70.31 | 1.0116 | 0.9993 | 0.9746 | 0.07 | 2.54 | 44.88 | 54.8 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (without Berwick Bank) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 43.68 | 1.0119 | 0.9995 | 0.9834 | 0.05 | 1.66 | 46.6 | 53.08 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant | 42.92 | 1.0119 | 0.9996 | 0.9842 | 0.04 | 1.58 | 46.72 | 52.82 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|--------------------------------|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (70/1) (without Berwick Bank) | | | | | | | | |
| Sule Skerry and Sule Stack SPA | Baseline | 0 | 1.0123 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Collision only (with Berwick Bank) | 27.10 | 1.0106 | 0.9982 | 0.9385 | 0.18 | 6.15 | 38.18 | 61.08 |
| | Collision only (without Berwick Bank) | 26.69 | 1.0106 | 0.9983 | 0.9395 | 0.17 | 6.05 | 38.52 | 60.78 |
| | Displacement NatureScot Upper (70/3) (with Berwick Bank) | 18.14 | 1.0111 | 0.9988 | 0.9587 | 0.12 | 4.13 | 41.82 | 57.52 |
| | Displacement NatureScot | 17.98 | 1.0112 | 0.9988 | 0.9585 | 0.12 | 4.15 | 41.96 | 57.36 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Upper (70/3) (without Berwick Bank) | | | | | | | | |
| | Displacement NatureScot Lower and Applicant (70/1) (with Berwick Bank) | 6.05 | 1.0119 | 0.9996 | 0.9858 | 0.04 | 1.42 | 47.72 | 52.84 |
| | Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 5.99 | 1.0119 | 0.9996 | 0.9857 | 0.04 | 1.43 | 47.90 | 52.46 |
| | Combined Collisions and | 45.24 | 1.0093 | 0.9971 | 0.8996 | 0.29 | 10.04 | 31.16 | 67.46 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|--|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | Displacement NatureScot Upper (with Berwick Bank) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Upper (without Berwick Bank) | 44.67 | 1.0094 | 0.9971 | 0.9006 | 0.29 | 9.94 | 31.00 | 67.32 |
| | Combined Collisions and Displacement NatureScot Lower and Applicant | 33.15 | 1.0101 | 0.9979 | 0.9255 | 0.21 | 7.45 | 35.92 | 63.26 |

| SPA | Impact Scenario | Annual Mortality Estimate (Adult Birds) | Density-Independence (After 50 Years) | | | | | Quantiles | |
|-----|---|---|---------------------------------------|------------|------------|--|--|-----------|---------|
| | | | Median Annual GR | Median CGR | Median CPS | Reduction In Growth Rate (Between Unimpacted And Impacted) (%) | Reduction In Population Size (Between Unimpacted And Impacted) (%) | U=50 %I | I=50 %U |
| | (70/1) (with Berwick Bank) | | | | | | | | |
| | Combined Collisions and Displacement NatureScot Lower and Applicant (70/1) (without Berwick Bank) | 32.68 | 1.0102 | 0.9979 | 0.9262 | 0.21 | 7.38 | 36.20 | 62.98 |

6 GLOSSARY OF TERMS AND ABBREVIATIONS

6.1.1.1 A list of key terms and acronyms used in this Appendix are provided in **Table 6-1** and **Table 6-2**.

Table 6-1 Acronyms and abbreviations

| Term | Definition |
|--------|--|
| AOB | Apparently Occupied Burrow |
| AON | Apparently Occupied Nest |
| AOS | Apparently Occupied Site |
| BB | Berwick Bank (wind farm project) |
| BTO | British Trust for Ornithology |
| CGR | Counterfactual of Growth Rate |
| CRM | Collision Risk Modelling |
| CPS | Counterfactual of Population Size |
| EIA | Environmental Impact Assessment |
| EIAR | Environmental Impact Assessment Report |
| HRA | Habitats Regulations Appraisal |
| IND | Individuals |
| JNCC | Joint Nature Conservation Committee |
| MD-LOT | Marine Directorate - Licensing Operations Team |
| MHWS | Mean High Water Springs |
| MRSea | Marine Renewables Strategic Environmental Assessment |
| OCAS | Offshore Cable Area of Search |
| OSP | Offshore Substation Platform |
| OWF | Offshore Wind Farm |
| PVA | Population Viability Analysis |
| RIAA | Report to Inform Appropriate Assessment |
| SD | Standard Deviation |
| SNCB | Statutory Nature Conservation Body |
| SPA | Special Protection Area |
| UK | United Kingdom |
| WTG | Wind Turbine Generator |

| Term | Definition |
|------|-----------------------------|
| WWT | Wildfowl and Wetlands Trust |

Table 6-2 Glossary

| Term | Meaning |
|--------------------------------------|---|
| the Applicant | Sporad na Mara Limited (the Project owner) |
| Array Area | The offshore area within which the offshore wind turbine generators (WTGs), associated foundations, Offshore Cables, and Offshore Substation Platform (OSP) (if required), will be located. This area encompasses the Turbine Area that will contain all above water surface infrastructure (WTGs / OSP) and an additional area within which further below water infrastructure (foundations and cables) may also be located. |
| Counterfactual of Growth Rate | The ratio of impacted to unimpacted annual growth rate. |
| Counterfactual of Population Size | The ratio of impacted to unimpacted population size. |
| Cumulative Effects | The combined effect of the Offshore Project in combination with the effects from a number of different projects, on the same single receptor/resource. Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with the Offshore Project. |
| Landfall | This consists of works from offshore Horizontal Directional Drill (HDD) exit pits to onshore at the Transition Joint Bays (TJB). The infrastructure and installation methods associated with the Landfall involves both onshore and offshore components. |
| Offshore Cables | Electrical and communication cables located within the Offshore Cable Area of Search (OCAS) and Array Area. |
| Offshore Cable Area of Search (OCAS) | The area within which the offshore cable infrastructure between the Array Area and Landfall up to Mean High Water Springs (MHWS) will be located. |
| Offshore Project | The offshore components of the Sporad na Mara offshore wind farm (the Project) located seaward of Mean High Water Springs (MHWS). |
| Offshore Project Boundary | The 'red line boundary' encompassing the Offshore Project. |

| Term | Meaning |
|------------------------------------|--|
| Offshore Substation Platform (OSP) | The optional offshore substation located within the Array Area. Includes the platform and associated components which allows the voltage to be increased to meet onward transmission requirements. |
| Project | The Spiorad na Mara offshore wind farm development. This term describes the whole development, including all offshore and onshore components. |
| Population Viability Analysis | The process of determining the probability that a population will persist over a specified time period. |
| Sabbaticals | This refers to mature seabirds that do not attempt to breed in a given year, despite being capable of doing so. These individuals typically remain at sea or visit breeding colonies only briefly, without engaging in nesting or chick-rearing. |
| Turbine Area | A reduced area within the Array Area where above water surface infrastructure would be located i.e. Wind Turbine Generators (WTG) or Offshore Substation Platform (OSP). Developed and refined through environmental assessment. |
| Wind Turbine Generator (WTG) | The wind turbines that generate electricity consisting of tubular towers and blades attached to a nacelle housing mechanical and electrical generating equipment |

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