

# Outer Dowsing Offshore Wind

## Supplementary Information

### Ornithology: Population Viability Analysis Parameter log

Date: May 2024

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Project:	<b>Whole Wind Farm</b>		Sub Project/Package:	Whole Asset		
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1.0	May 2024	For issue to Natural England as requested	GoBe	GoBe	ODOW	ODOW



# Population Viability Analysis Parameter log

## Gannet FFC

### Set up

The log file was created on: 2024-01-25 09:29:23 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

### Basic information

This run had reference name "Gannet FFC".  
PVA model run type: simplescenarios.  
Model to use for environmental stochasticity: betagamma.  
Model for density dependence: nodd.  
Include demographic stochasticity in model?: Yes.  
Number of simulations: 5000.  
Random seed: 422.  
Years for burn-in: 5.  
Case study selected: None.

### Baseline demographic rates

Species chosen to set initial values: Northern Gannet.  
Region type to use for breeding success data: Site.  
Available colony-specific survival rate: National. Sector to use within breeding success region: Flamborough Head and Bempton Cliffs SPA; Flamborough Head and Bempton Cliffs.  
Age at first breeding: 5.  
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.  
Number of subpopulations: 1.

Are demographic rates applied separately to each subpopulation?: No.  
Units for initial population size: breeding.adults  
Are baseline demographic rates specified separately for immatures?: Yes.

## Population 1

**Initial population values:** Initial population 30466 in 2023

**Productivity rate per pair:** mean: 0.7975 , sd: 0.06632258

**Adult survival rate:** mean: 0.919 , sd: 0.042

### Immatures survival rates:

Age class 0 to 1 - mean: 0.424 , sd: 0.045 , DD: NA

Age class 1 to 2 - mean: 0.829 , sd: 0.026 , DD: NA

Age class 2 to 3 - mean: 0.891 , sd: 0.019 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 0.019 , DD: NA

Age class 4 to 5 - mean: 0.919 , sd: 0.042 , DD: NA

## Impacts

Number of impact scenarios: 6.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

## Impact on Demographic Rates

### Scenario A - Name: Project alone 60,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000154 , se: NA

## Scenario B - Name: Project alone 70,1

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000177 , se: NA

## Scenario C - Name: Project alone 80,1

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000194 , se: NA

## Scenario D - Name: In-combination 60,1

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.004446 , se: NA

## Scenario E - Name: In-combination 70,1

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.004787 , se: NA

## Scenario F - Name: In-combination 80,1

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.005127 , se: NA

## Output:

First year to include in outputs: 2024

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA

## Guillemot Farne

### Set up

The log file was created on: 2024-01-26 09:27:02 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

### Basic information

This run had reference name "Guillemot Farne".  
PVA model run type: simplescenarios.  
Model to use for environmental stochasticity: betagamma.  
Model for density dependence: nodd.  
Include demographic stochasticity in model?: Yes.  
Number of simulations: 5000.  
Random seed: 9731.  
Years for burn-in: 5.  
Case study selected: None.

### Baseline demographic rates

Species chosen to set initial values: Common Guillemot.  
Region type to use for breeding success data: Site.  
Available colony-specific survival rate: National. Sector to use within breeding success region: Farne Islands SPA;Farne Islands.  
Age at first breeding: 6.  
Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.  
Number of subpopulations: 1.  
Are demographic rates applied separately to each subpopulation?: No.  
Units for initial population size: breeding.adults  
Are baseline demographic rates specified separately for immatures?: Yes.

## Population 1

**Initial population values:** Initial population 46332 in 2023

**Productivity rate per pair:** mean: 0.7877778 , sd: 0.1401586

**Adult survival rate:** mean: 0.94 , sd: 0.025

### Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 0.058 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 0.152 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 0.098 , DD: NA

Age class 3 to 4 - mean: 0.938 , sd: 0.107 , DD: NA

Age class 4 to 5 - mean: 0.94 , sd: 0.025 , DD: NA

Age class 5 to 6 - mean: 0.94 , sd: 0.025 , DD: NA

## Impacts

Number of impact scenarios: 8.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

## Impact on Demographic Rates

### Scenario A - Name: Project alone 30,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 2.7e-05 , se: NA

### Scenario B - Name: Project alone 50,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 4.5e-05 , se: NA

### Scenario C - Name: Project alone 70,2

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000126 , se: NA

### Scenario D - Name: Project alone 70,10

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000632 , se: NA

### Scenario E - Name: In-combination, 30,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000952 , se: NA

### Scenario F - Name: In-combination, 50,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.001587 , se: NA

### Scenario G - Name: In-combination, 70,2

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.004442 , se: NA



## Scenario H - Name: In-combination, 70,10

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.022212 , se: NA

### Output:

First year to include in outputs: 2024

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA

## Guillemot FFC (NE approach)

### Set up

The log file was created on: 2024-01-25 11:05:56 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##          Package      Version
## popbio      "popbio"      "2.4.4"
## shiny       "shiny"        "1.1.0"
## shinyjs     "shinyjs"      "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets "shinyWidgets"  "0.4.5"
## DT          "DT"           "0.5"
## plotly      "plotly"       "4.8.0"
## rmarkdown   "rmarkdown"    "1.10"
## dplyr       "dplyr"        "0.7.6"
## tidyr       "tidyr"        "0.8.1"
```

### Basic information

This run had reference name "Guillemot FFC (NE approach)".

PVA model run type: simplescenarios.

Model to use for environmental stochasticity: betagamma.

Model for density dependence: nodd.

Include demographic stochasticity in model?: Yes.

Number of simulations: 5000.

Random seed: 3920.

Years for burn-in: 5.

Case study selected: None.

### Baseline demographic rates

Species chosen to set initial values: Common Guillemot.

Region type to use for breeding success data: Site.

Available colony-specific survival rate: National. Sector to use within breeding success region: Flamborough Head and Bempton Cliffs SPA; Flamborough Head and Bempton Cliffs.

Age at first breeding: 6.

Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.

Number of subpopulations: 1.

Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults

Are baseline demographic rates specified separately for immatures?: Yes.

## Population 1

**Initial population values:** Initial population 149980 in 2022

**Productivity rate per pair:** mean: 0.7241176 , sd: 0.1180603

**Adult survival rate:** mean: 0.94 , sd: 0.025

### Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 0.058 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 0.152 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 0.098 , DD: NA

Age class 3 to 4 - mean: 0.938 , sd: 0.107 , DD: NA

Age class 4 to 5 - mean: 0.94 , sd: 0.025 , DD: NA

Age class 5 to 6 - mean: 0.94 , sd: 0.025 , DD: NA

## Impacts

Number of impact scenarios: 8.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

## Impact on Demographic Rates

### Scenario A - Name: Project alone 30,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000339 , se: NA

### Scenario B - Name: Project alone 50,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000565 , se: NA

### Scenario C - Name: Project alone 70,2

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.001582 , se: NA

### Scenario D - Name: Project alone 70, 10

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.007906 , se: NA

### Scenario E - Name: In-combination 30,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.001932 , se: NA

### Scenario F - Name: In-combination 50,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.00322 , se: NA

### Scenario G - Name: In-combination 70, 2

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.009016 , se: NA

## Scenario H - Name: In-combination 70, 10

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.045078 , se: NA

### Output:

First year to include in outputs: 2024

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA



## Guillemot FFC (Project approach)

### Set up

The log file was created on: 2024-01-25 10:40:05 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

### Basic information

This run had reference name "Guillemot FFC (Project approach)".

PVA model run type: simplescenarios.

Model to use for environmental stochasticity: betagamma.

Model for density dependence: nodd.

Include demographic stochasticity in model?: Yes.

Number of simulations: 5000.

Random seed: 8144.

Years for burn-in: 5.

Case study selected: None.

### Baseline demographic rates

Species chosen to set initial values: Common Guillemot.

Region type to use for breeding success data: Site.

Available colony-specific survival rate: National. Sector to use within breeding success region: Flamborough Head and Bempton Cliffs SPA; Flamborough Head and Bempton Cliffs.

Age at first breeding: 6.

Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.

Number of subpopulations: 1.

Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults

Are baseline demographic rates specified separately for immatures?: Yes.

## Population 1

**Initial population values:** Initial population 149980 in 2022

**Productivity rate per pair:** mean: 0.7241176 , sd: 0.1180603

**Adult survival rate:** mean: 0.94 , sd: 0.025

### Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 0.058 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 0.152 , DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 0.098 , DD: NA

Age class 3 to 4 - mean: 0.938 , sd: 0.107 , DD: NA

Age class 4 to 5 - mean: 0.94 , sd: 0.025 , DD: NA

Age class 5 to 6 - mean: 0.94 , sd: 0.025 , DD: NA

## Impacts

Number of impact scenarios: 8.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

## Impact on Demographic Rates

### Scenario A - Name: Project alone 30,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000103 , se: NA

### Scenario B - Name: Project alone 50,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000173 , se: NA

### Scenario C - Name: Project alone 70,2

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000483 , se: NA

### Scenario D - Name: Project alone 70, 10

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.002418 , se: NA

### Scenario E - Name: In-combination 30,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.001697 , se: NA

### Scenario F - Name: In-combination 50,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.002828 , se: NA

### Scenario G - Name: In-combination 70, 2

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.007918 , se: NA

## Scenario H - Name: In-combination 70, 10

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.03959 , se: NA

### Output:

First year to include in outputs: 2024

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA

## Kittiwake FFC

### Set up

The log file was created on: 2024-01-24 16:45:21 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

```
##          Package          Version
## popbio      "popbio"        "2.4.4"
## shiny       "shiny"         "1.1.0"
## shinyjs     "shinyjs"        "1.0"
## shinydashboard "shinydashboard" "0.7.1"
## shinyWidgets "shinyWidgets"   "0.4.5"
## DT          "DT"             "0.5"
## plotly      "plotly"         "4.8.0"
## rmarkdown   "rmarkdown"     "1.10"
## dplyr       "dplyr"         "0.7.6"
## tidyr       "tidyr"         "0.8.1"
```

### Basic information

This run had reference name “Kittiwake FFC”.  
 PVA model run type: simplescenarios.  
 Model to use for environmental stochasticity: betagamma.  
 Model for density dependence: nodd.  
 Include demographic stochasticity in model?: Yes.  
 Number of simulations: 5000.  
 Random seed: 5456.  
 Years for burn-in: 5.  
 Case study selected: None.

### Baseline demographic rates

Species chosen to set initial values: Black-Legged Kittiwake.  
 Region type to use for breeding success data: Site.  
 Available colony-specific survival rate: National. Sector to use within breeding success region: Flamborough Head and Bempton Cliffs SPA;Flamborough Head and Bempton Cliffs.  
 Age at first breeding: 4.  
 Is there an upper constraint on productivity in the model?: Yes, constrained to 2 per pair.  
 Number of subpopulations: 1.  
 Are demographic rates applied separately to each subpopulation?: No.  
 Units for initial population size: breeding.adults  
 Are baseline demographic rates specified separately for immatures?: Yes.



## Population 1

**Initial population values:** Initial population 89148 in 2022

**Productivity rate per pair:** mean: 0.8732258 , sd: 0.332329

**Adult survival rate:** mean: 0.854 , sd: 0.077

### Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 0.077 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 0.077 , DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 0.077 , DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 0.077 , DD: NA

## Impacts

Number of impact scenarios: 3.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

## Impact on Demographic Rates

### Scenario A - Name: Project alone

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000163 , se: NA

### Scenario B - Name: In-combination (without compensated projects)

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.004296 , se: NA

## Scenario C - Name: In-combination (with compensated projects)

### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.005966 , se: NA

### Output:

First year to include in outputs: 2024

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA

## Puffin Coquet

### Set up

The log file was created on: 2024-01-25 12:27:32 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

### Basic information

This run had reference name "Puffin Coquet".  
 PVA model run type: simplescenarios.  
 Model to use for environmental stochasticity: betagamma.  
 Model for density dependence: nodd.  
 Include demographic stochasticity in model?: Yes.  
 Number of simulations: 5000.  
 Random seed: 5980.  
 Years for burn-in: 0.  
 Case study selected: None.

### Baseline demographic rates

Species chosen to set initial values: Atlantic Puffin.  
 Region type to use for breeding success data: MSFD.  
 Available colony-specific survival rate: National. Sector to use within breeding success region: Greater North Sea.  
 Age at first breeding: 5.  
 Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.  
 Number of subpopulations: 1.  
 Are demographic rates applied separately to each subpopulation?: No.  
 Units for initial population size: breeding.adults  
 Are baseline demographic rates specified separately for immatures?: Yes.

## Population 1

**Initial population values:** Initial population 50058 in 2019

**Productivity rate per pair:** mean: 0.5760227 , sd: 0.3308661

**Adult survival rate:** mean: 0.907 , sd: 0.083

### Immatures survival rates:

Age class 0 to 1 - mean: 0.709 , sd: 0.108 , DD: NA

Age class 1 to 2 - mean: 0.709 , sd: 0.108 , DD: NA

Age class 2 to 3 - mean: 0.709 , sd: 0.108 , DD: NA

Age class 3 to 4 - mean: 0.76 , sd: 0.093 , DD: NA

Age class 4 to 5 - mean: 0.805 , sd: 0.083 , DD: NA

## Impacts

Number of impact scenarios: 8.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

## Impact on Demographic Rates

### Scenario A - Name: Project alone 30,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 2.2e-05 , se: NA

### Scenario B - Name: Project alone 50,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean:  $3.6e-05$  , se: NA

### **Scenario C - Name: Project alone 70,2**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000118 , se: NA

### **Scenario D - Name: Project alone 70, 10**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000505 , se: NA

### **Scenario E - Name: In-combination 30,1**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000184 , se: NA

### **Scenario F - Name: In-combination 50,1**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000307 , se: NA

### **Scenario G - Name: In-combination 70, 2**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000859 , se: NA

### **Scenario H - Name: In-combination 70, 10**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.004294 , se: NA



## Output:

First year to include in outputs: 2024

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA

## Razorbill FFC (Project approach)

### Set up

The log file was created on: 2024-01-25 11:23:17 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

### Basic information

This run had reference name "Razorbill FFC (Project approach)".

PVA model run type: simplescenarios.

Model to use for environmental stochasticity: betagamma.

Model for density dependence: nodd.

Include demographic stochasticity in model?: Yes.

Number of simulations: 5000.

Random seed: 8857.

Years for burn-in: 5.

Case study selected: None.

### Baseline demographic rates

Species chosen to set initial values: Razorbill.

Region type to use for breeding success data: Site.

Available colony-specific survival rate: National. Sector to use within breeding success region: Flamborough Head and Bempton Cliffs SPA; Flamborough Head and Bempton Cliffs.

Age at first breeding: 5.

Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.

Number of subpopulations: 1.

Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults

Are baseline demographic rates specified separately for immatures?: Yes.

## Population 1

**Initial population values:** Initial population 61346 in 2022

**Productivity rate per pair:** mean: 0.6188889 , sd: 0.07490735

**Adult survival rate:** mean: 0.895 , sd: 0.067

### Immatures survival rates:

Age class 0 to 1 - mean: 0.63 , sd: 0.067 , DD: NA

Age class 1 to 2 - mean: 0.63 , sd: 0.067 , DD: NA

Age class 2 to 3 - mean: 0.895 , sd: 0.067 , DD: NA

Age class 3 to 4 - mean: 0.895 , sd: 0.067 , DD: NA

Age class 4 to 5 - mean: 0.895 , sd: 0.067 , DD: NA

## Impacts

Number of impact scenarios: 8.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

## Impact on Demographic Rates

### Scenario A - Name: Project alone 30,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 1e-04 , se: NA

### Scenario B - Name: Project alone 50,1

#### All subpopulations

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000167 , se: NA

### **Scenario C - Name: Project alone 70,2**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000468 , se: NA

### **Scenario D - Name: Project alone 70, 10**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.002339 , se: NA

### **Scenario E - Name: In-combination 30,1**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.000811 , se: NA

### **Scenario F - Name: In-combination 50,1**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.001351 , se: NA

### **Scenario G - Name: In-combination 70, 2**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.003783 , se: NA

### **Scenario H - Name: In-combination 70, 10**

#### **All subpopulations**

**Impact on productivity rate** mean: 0 , se: NA

**Impact on adult survival rate** mean: 0.018913 , se: NA

## Output:

First year to include in outputs: 2024

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA