



Biosecurity
COMMONS

Biosecurity Commons Quick Start Guide



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Version: 0.2



Biosecurity Commons Quick Start Guide

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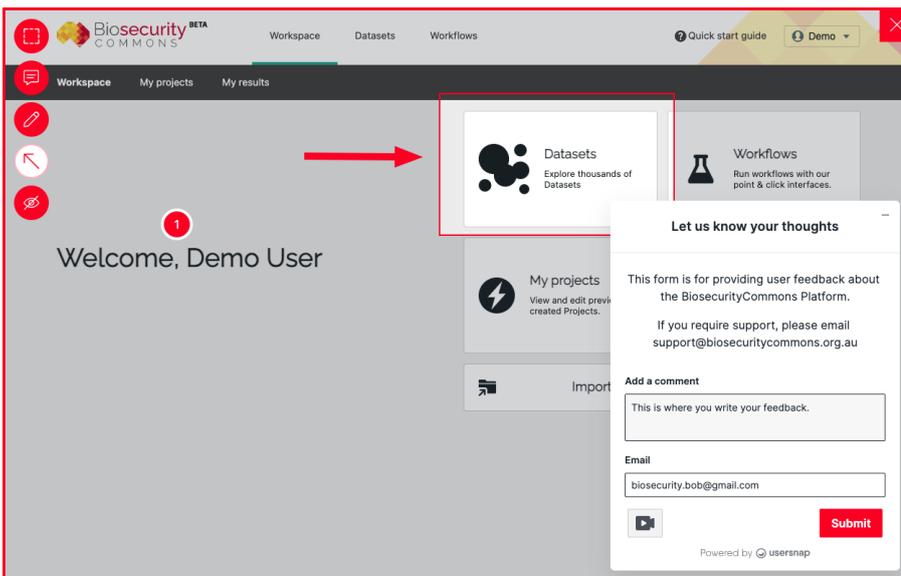
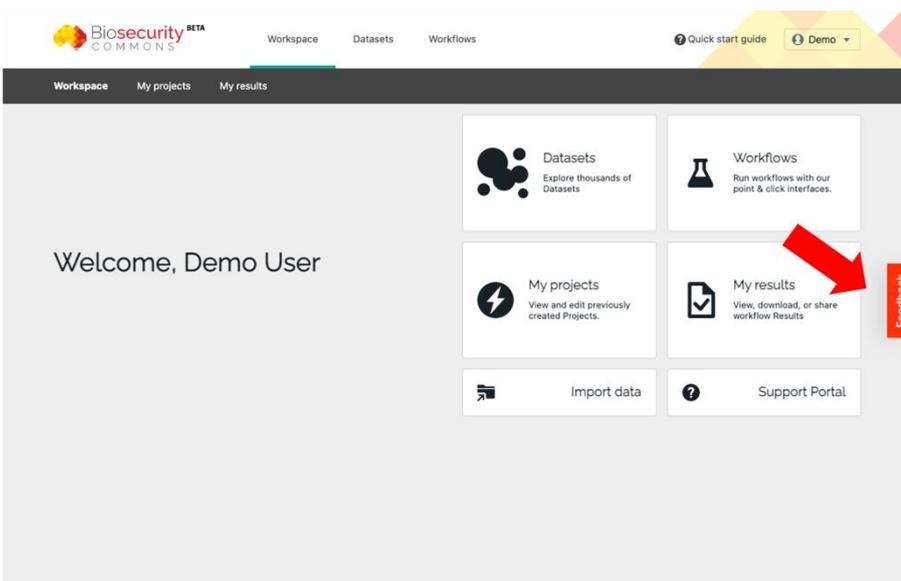


1 Biosecurity Commons beta platform

The beta release of the Biosecurity Commons platform is available for testing and gathering user feedback. This is an important part of refining and improving the platform prior to its release to production. We encourage all users of the platform to use the inbuilt feedback widget to easily provide feedback directly to our development team.

1.1 Feedback Widget

The feedback widget is available on the right-hand side of the web browser. Selecting the widget will launch the feedback tool and allow users to highlight areas, add comments and draw on the web page. Please include your email address so we can contact you if we need more information.

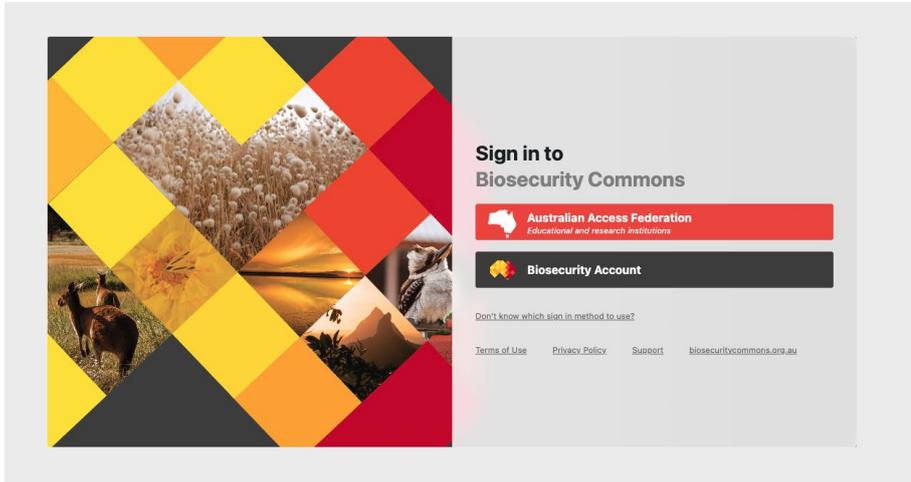




2 Logging in to Biosecurity Commons

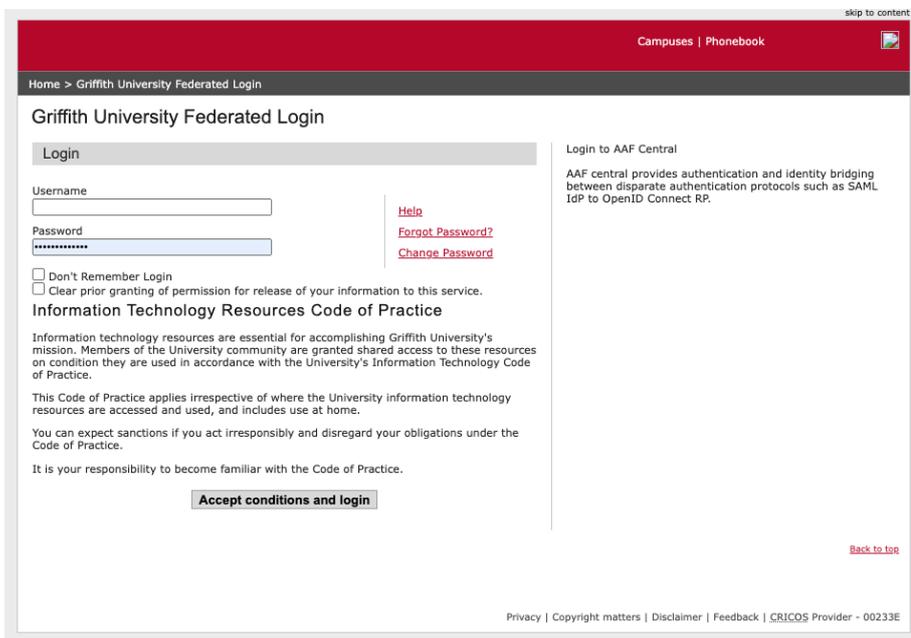
The URL for the Biosecurity Commons production environment is:

<https://app.biosecuritycommons.org.au>



2.1 AAF Authentication

If your organisation is using AAF authentication (e.g. universities) select the AAF sign in option and you will be directed to your organisation's authentication page.

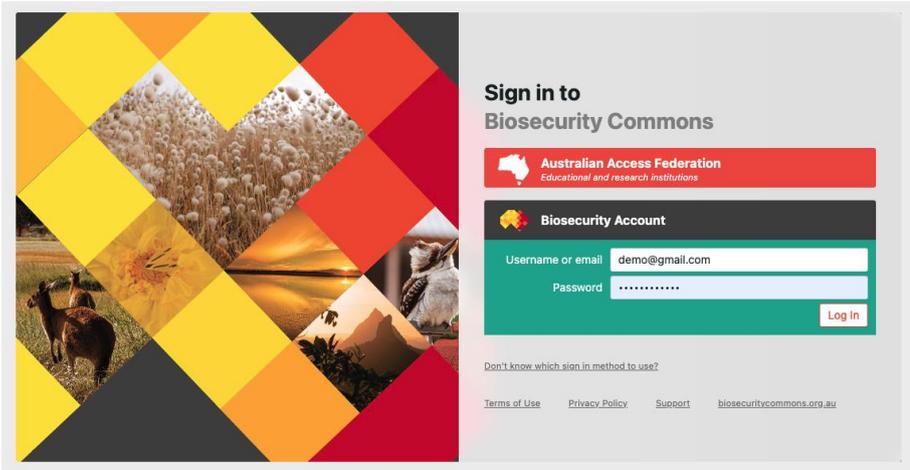




2.2 Biosecurity Account

If your organisation doesn't have access to AFF you will need a Biosecurity user account login assigned to you, which will be a combination of your email and password.

If you require an account to be created please email support@biosecuritycommons.org.au (please note all accounts are created free of charge until 30 June 2022, after that time it will depend on future funding models that are yet to be determined).



**Sign in to
Biosecurity Commons**

 **Australian Access Federation**
Educational and research institutions

 **Biosecurity Account**

Username or email

Password

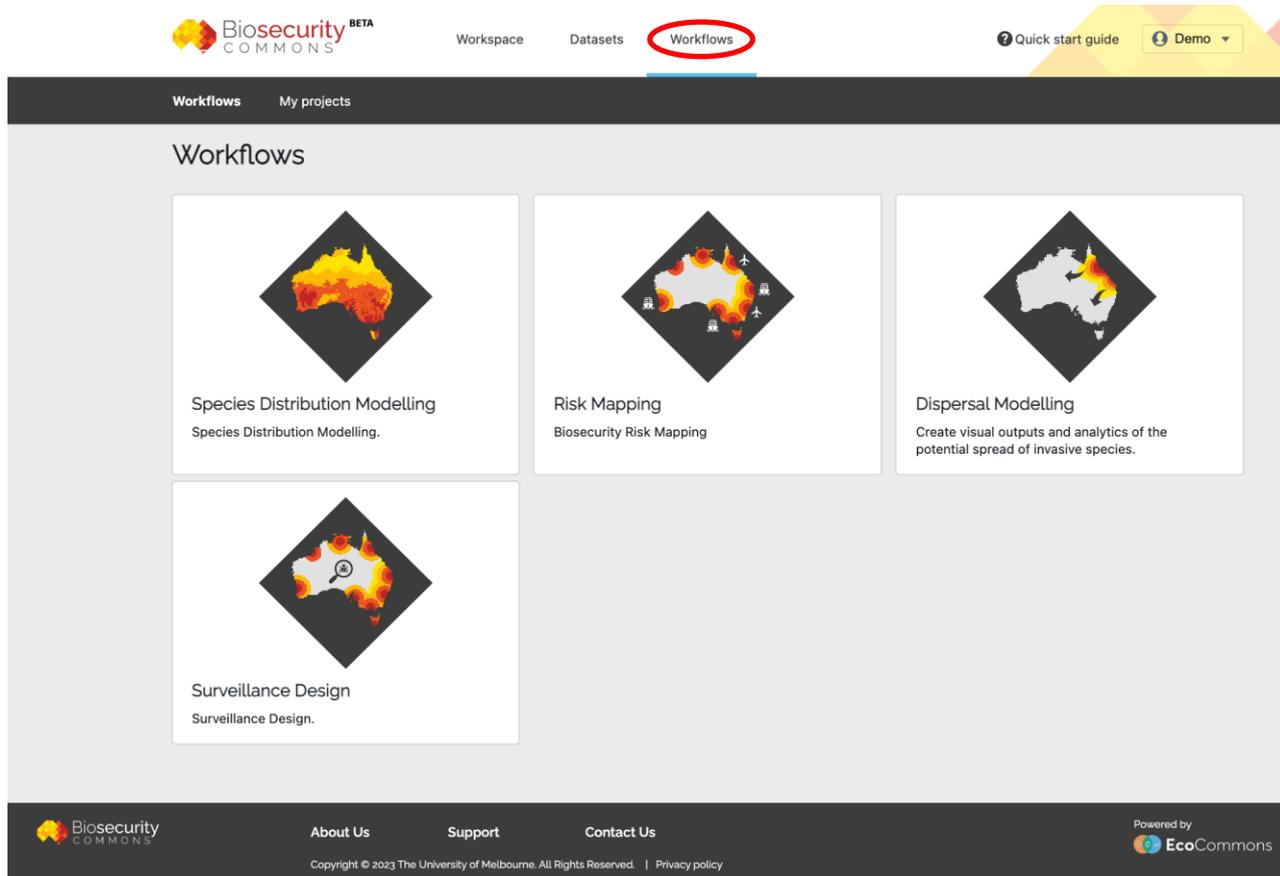
[Don't know which sign in method to use?](#)

[Terms of Use](#) [Privacy Policy](#) [Support](#) [biosecuritycommons.org.au](#)



3 Workflows

When complete, Biosecurity Commons will feature seven integrated workflows for modelling and analysing biosecurity risk and response. The workflows currently available in the platform can be accessed via the **Workflows** tab.



The screenshot shows the Biosecurity Commons website interface. At the top, the navigation bar includes the Biosecurity Commons logo, 'Workspace', 'Datasets', and 'Workflows' (which is circled in red). There are also links for 'Quick start guide' and a 'Demo' button. Below the navigation bar, the 'Workflows' section is active, showing a grid of four workflow cards:

- Species Distribution Modelling**: Species Distribution Modelling.
- Risk Mapping**: Biosecurity Risk Mapping.
- Dispersal Modelling**: Create visual outputs and analytics of the potential spread of invasive species.
- Surveillance Design**: Surveillance Design.

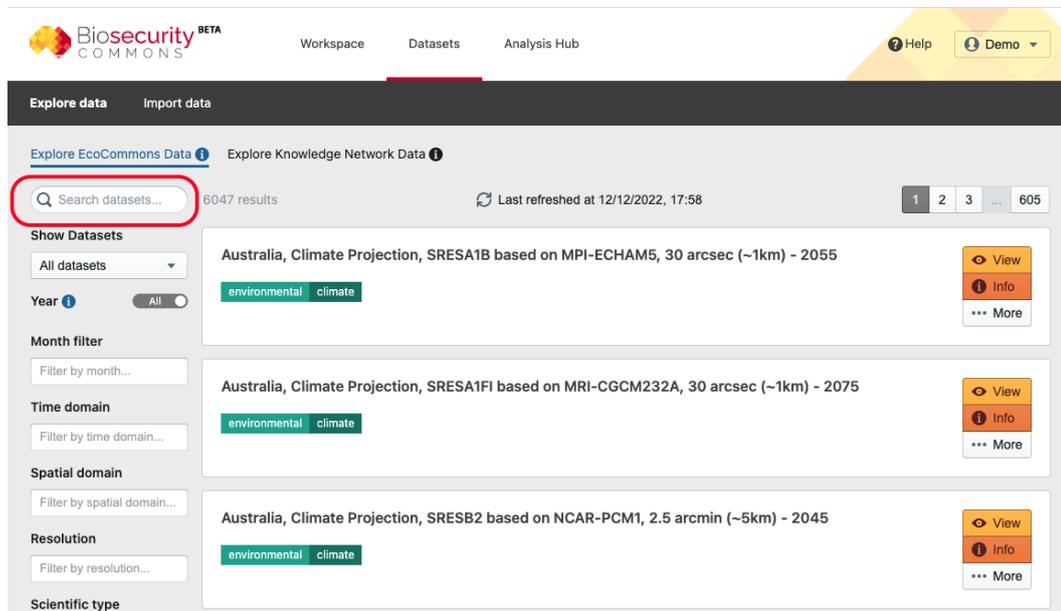
The footer contains the Biosecurity Commons logo, 'About Us', 'Support', and 'Contact Us' links. It also includes the text 'Powered by EcoCommons' and a copyright notice: 'Copyright © 2023 The University of Melbourne. All Rights Reserved. | Privacy policy'.



4 Data Catalogue

4.1 Curated datasets

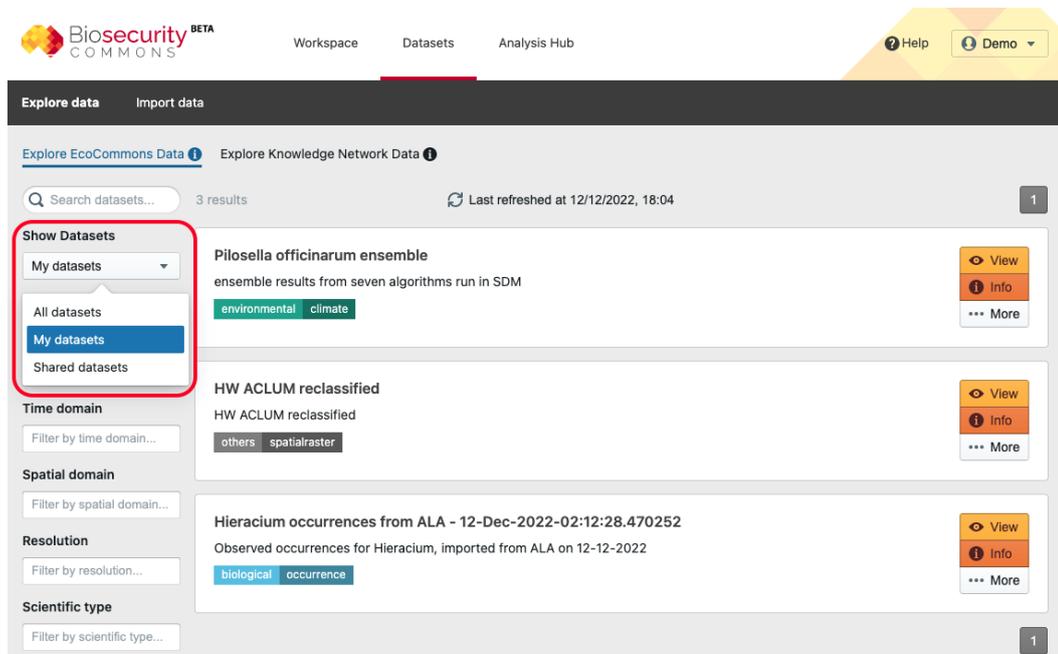
Users can search and view the range of curated datasets available in the platform.



The screenshot shows the 'Data Catalogue' interface. At the top, there are navigation tabs for 'Workspace', 'Datasets', and 'Analysis Hub'. Below this, there are links for 'Explore EcoCommons Data' and 'Explore Knowledge Network Data'. A search bar is highlighted with a red box, containing the text 'Search datasets...'. To the right of the search bar, it shows '6047 results' and 'Last refreshed at 12/12/2022, 17:58'. Below the search bar, there are filter options for 'Show Datasets', 'Year', 'Month filter', 'Time domain', 'Spatial domain', 'Resolution', and 'Scientific type'. The main content area displays three dataset entries, each with a title, a description, and a set of tags (e.g., 'environmental', 'climate'). Each entry also has 'View', 'Info', and 'More' buttons.

4.2 My datasets and Shared datasets

Users can search their own data collection or datasets that have been shared with them from other users.



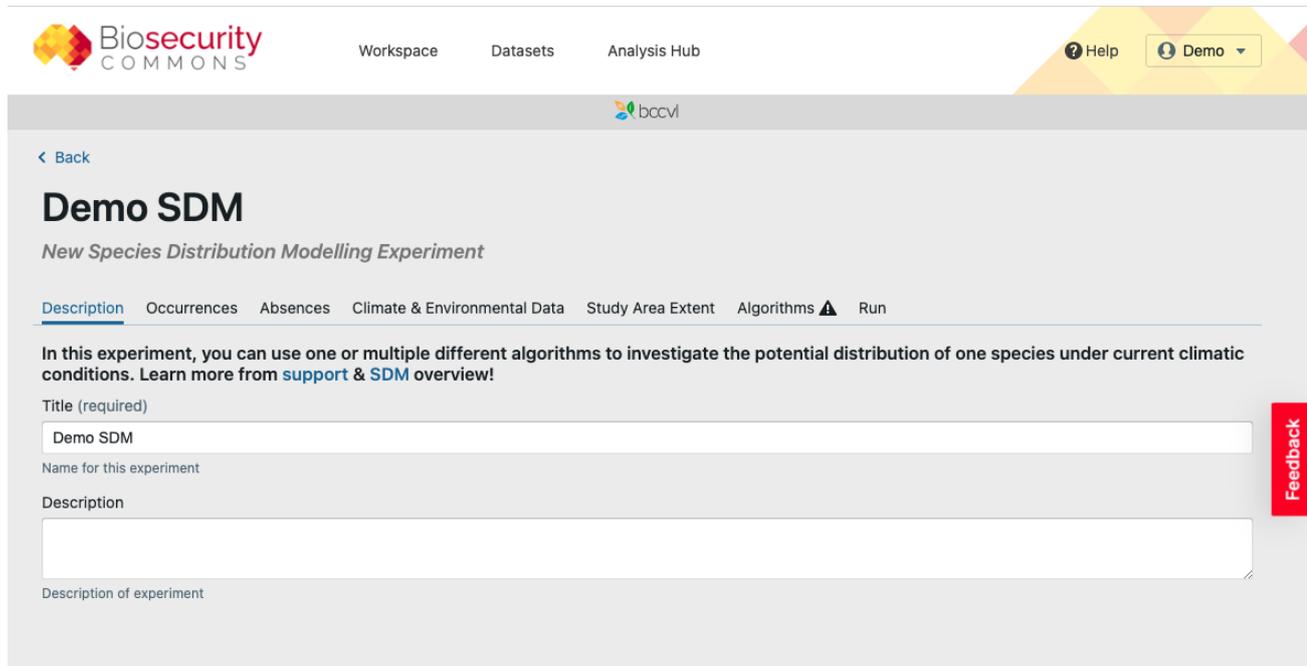
The screenshot shows the 'Data Catalogue' interface with the 'Show Datasets' dropdown menu highlighted by a red box. The dropdown menu is open, showing options for 'My datasets', 'All datasets', 'My datasets', and 'Shared datasets'. The main content area displays three dataset entries. The first entry is 'Pilosella officinarum ensemble' with tags 'environmental' and 'climate'. The second entry is 'HW ACLUM reclassified' with tags 'others' and 'spatialraster'. The third entry is 'Hieracium occurrences from ALA - 12-Dec-2022-02:12:28.470252' with tags 'biological' and 'occurrence'. Each entry has 'View', 'Info', and 'More' buttons.





5 Species Distribution Modelling

Users have access to a range of Species Distribution Modelling (SDM) experiments in Biosecurity Commons that can be accessed through the **Workflow** tab. Extensive information on the execution of SDM workflows can be found in the EcoCommons [BCCVL Modelling Wizard guide](#) and descriptions of the various SDMs can be found on the [Biosecurity Commons Support Portal](#).



The screenshot shows the Biosecurity Commons interface for a 'Demo SDM' experiment. The top navigation bar includes the Biosecurity Commons logo, 'Workspace', 'Datasets', and 'Analysis Hub' tabs, along with 'Help' and 'Demo' buttons. Below the navigation is a breadcrumb trail: '< Back'. The main heading is 'Demo SDM' with the subtitle 'New Species Distribution Modelling Experiment'. A horizontal menu contains 'Description' (selected), 'Occurrences', 'Absences', 'Climate & Environmental Data', 'Study Area Extent', 'Algorithms ⚠️', and 'Run'. A text block states: 'In this experiment, you can use one or multiple different algorithms to investigate the potential distribution of one species under current climatic conditions. Learn more from [support](#) & [SDM overview](#)!'. Below this are three input fields: 'Title (required)' with the value 'Demo SDM', 'Name for this experiment', and 'Description'. A red 'Feedback' button is positioned on the right side of the form.





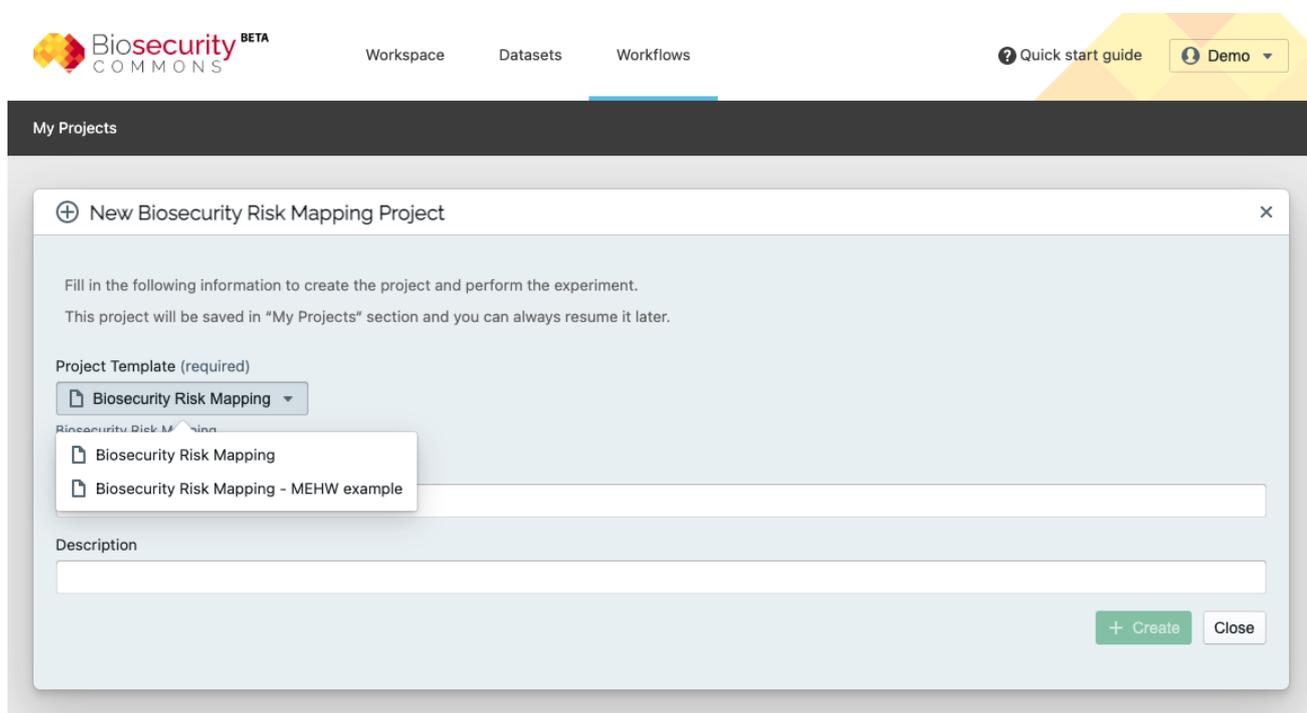
6 Risk Mapping

6.1 Introduction

This section provides a brief overview of the risk mapping workflow, for a detailed overview of the workflow please visit the [Risk Mapping workflow overview](#) support article.

6.2 Project Template

When creating a new Biosecurity Risk Mapping Project you have the option to select from an empty template or an example template that is prepopulated with data. The empty template provides the basics structure of the Risk Mapping workflow but without any preloaded datasets (except for the default region, see section 6.3). The example template provides an easy way for new users to interact with the platform and see what a completed risk map might look like.



The screenshot shows the 'New Biosecurity Risk Mapping Project' form in the Biosecurity Commons interface. The form is titled 'New Biosecurity Risk Mapping Project' and includes a close button (X) in the top right corner. Below the title, there is a brief instruction: 'Fill in the following information to create the project and perform the experiment. This project will be saved in "My Projects" section and you can always resume it later.' The form contains a 'Project Template (required)' section with a dropdown menu currently set to 'Biosecurity Risk Mapping'. A tooltip is visible over the dropdown, showing two options: 'Biosecurity Risk Mapping' and 'Biosecurity Risk Mapping - MEHW example'. Below the template selection is a 'Description' text input field. At the bottom right of the form, there are two buttons: a green '+ Create' button and a white 'Close' button. The top navigation bar of the application is visible, showing 'Workspace', 'Datasets', and 'Workflows' tabs, along with a 'Quick start guide' link and a 'Demo' dropdown menu.



6.3 Study Region

When you start a Risk Mapping workflow you will be presented with the elements of the Risk Mapping tree on the left side of the screen. The study region (Australia at 1km resolution) is the only dataset loaded by default. The study region can be changed by the user, however at this stage you will need to upload your own dataset (geotiff).

Risk Map Demo

last update: 12 Dec 2022
template: bsrmap (v0.10.19)

← Previous step
Next step →

- + Study Region
- TEMPLATE
Template - Australian 1km
- Pest Establishment Likelihood
- Pest Suitability
 - Abiotic Suitability
 - Biotic Suitability
 - Pest Arrivals
- My Exported Results

Study Region Parameters

(x) Input Parameters debug

The area to conduct the desired experiment which includes the extent (inclusive of the boundaries of the study area), resolution (single size of all grid cells in the study area), and coordinate reference system (CRS, the coordinate system and spatial projection used to turn the round earth into a flat map). This will be used to conform the selected resolution, extent and CRS of all project inputs.

Template dataset/resultset file*

A raster representing the spatial layer to conform to.

+
Australia 1km
▼
Info
🗑️

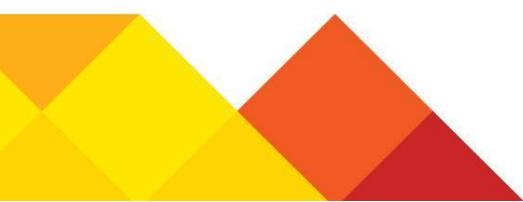
Template - Australian 1km
GDAG4 / Australian Albers - Cell count: [4010,3837], BBOX/Extent: [-8.19553,109.49189,-42.8198,150.63792]



ⓘ Run (Pest Establishment Likelihood)
Form has errors

✓ Save

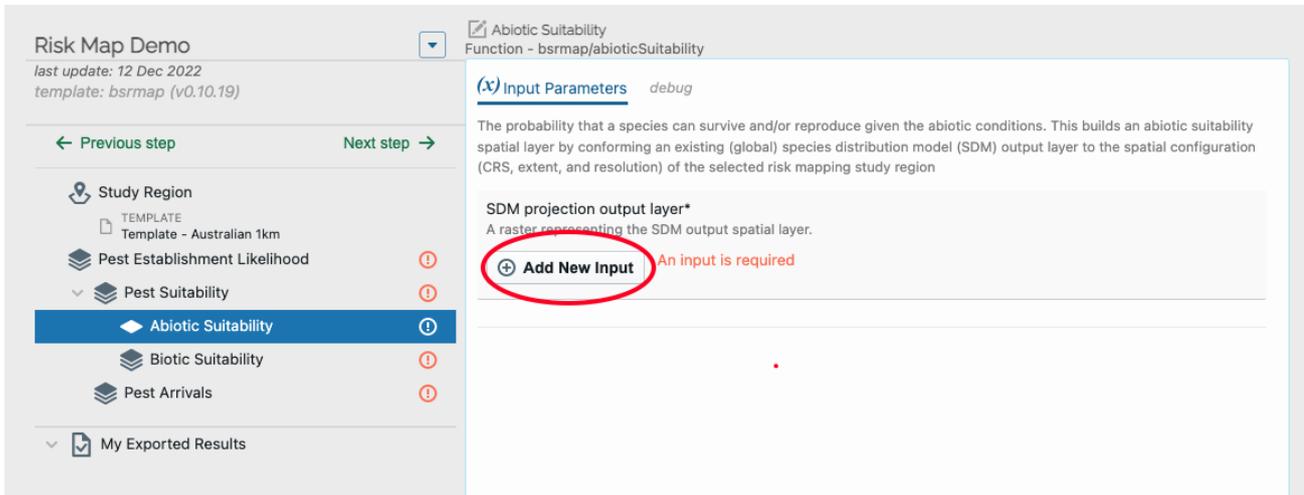
↺ Reset



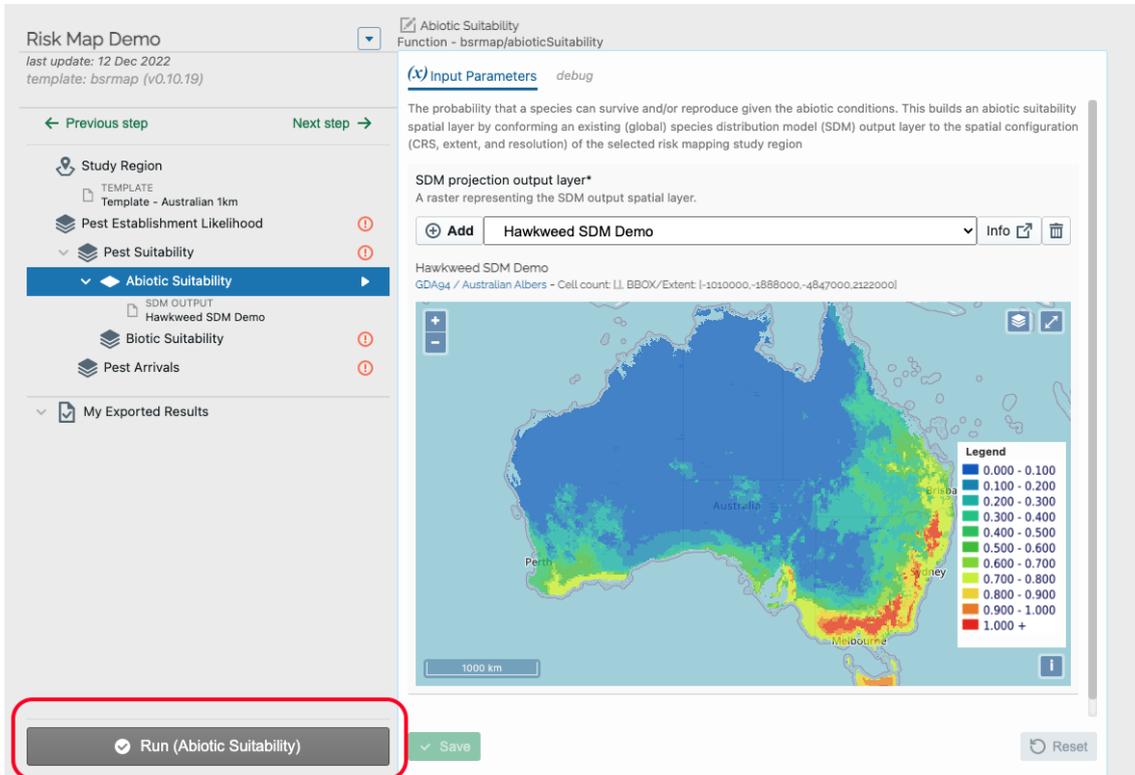
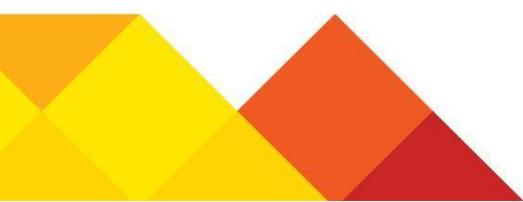


6.4 Abiotic Suitability

Use the **Add New Input** button to add the abiotic suitability layer (e.g. climatic suitability), this is usually a SDM that can be generated in the platform or imported by the user.



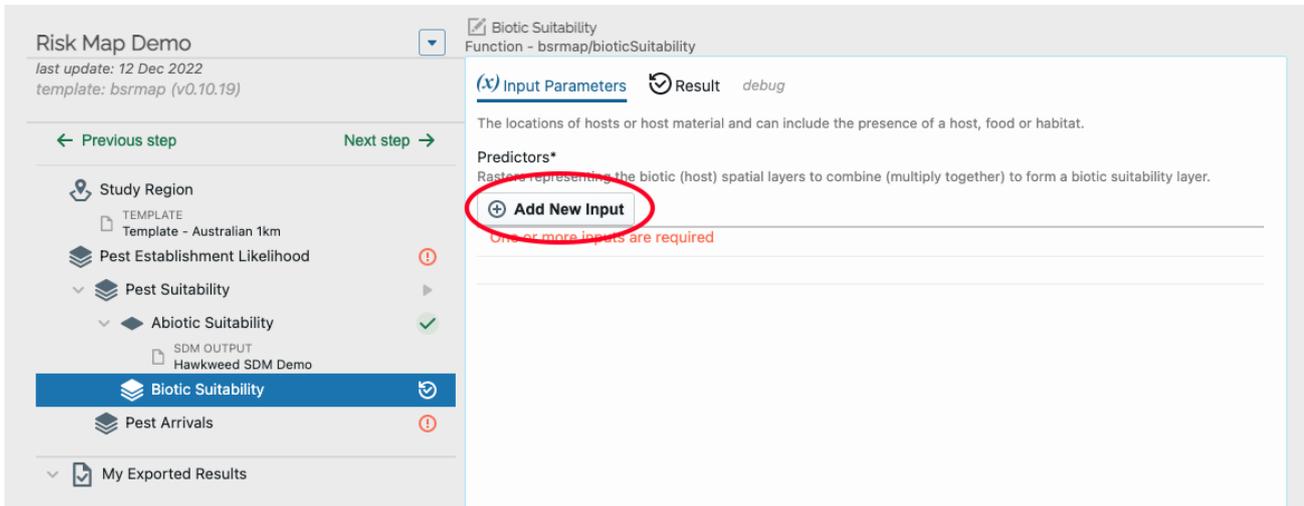
Run the **Abiotic Suitability** function. This will conform the abiotic layer to the study region extent, projection and resolution.



6.5 Biotic Suitability

Use the **Add New Input** button to add one or more biotic suitability layers, representing the presence of host or food.



Risk Map Demo
last update: 12 Dec 2022
template: bsrmap (v0.10.19)

← Previous step Next step →

- Study Region
- TEMPLATE
Template - Australian 1km
- Pest Establishment Likelihood
- ▼ Pest Suitability
- ▼ Abiotic Suitability
- SDM OUTPUT
Hawkweed SDM Demo
- Biotic Suitability**
- Pest Arrivals
- ▼ My Exported Results

Biotic Suitability
Function - bsrmap/bioticSuitability

(x) Input Parameters Result debug

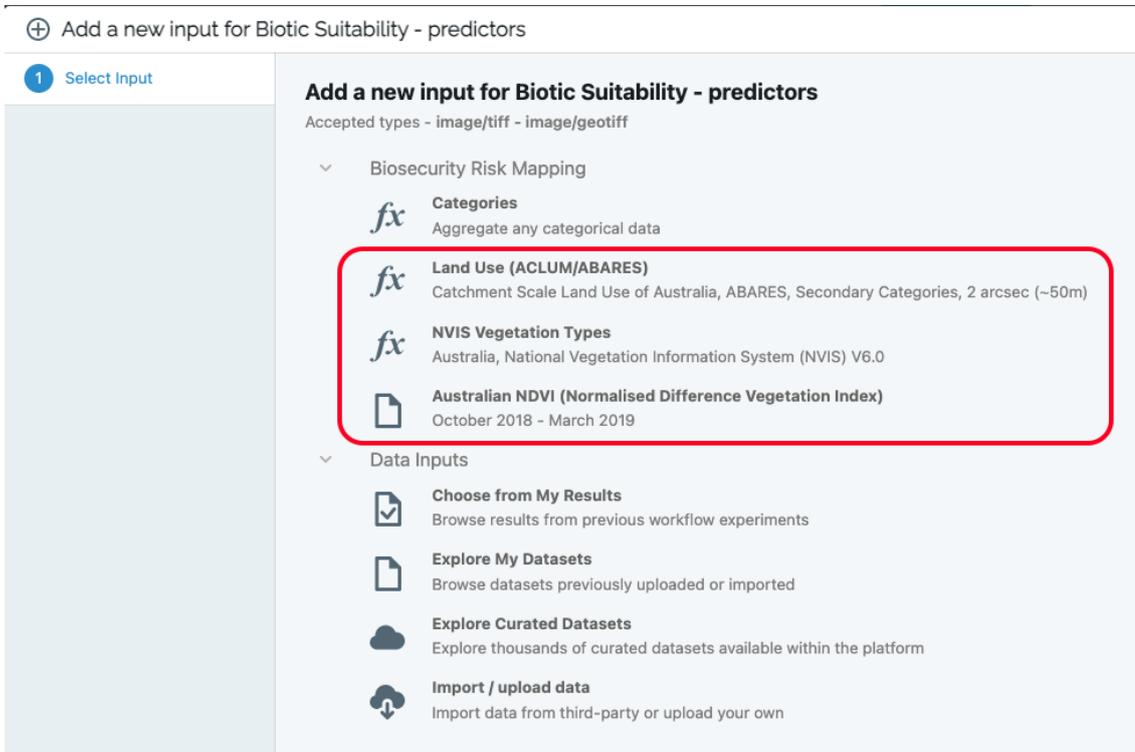
The locations of hosts or host material and can include the presence of a host, food or habitat.

Predictors*
Rasters representing the biotic (host) spatial layers to combine (multiply together) to form a biotic suitability layer.

+ Add New Input

One or more inputs are required

Users have the option of adding predefined curated datasets for land use (ACLUM), vegetation (NVIS) and NDVI.

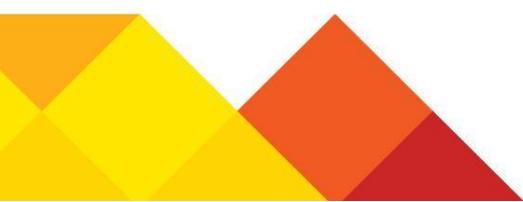


+ Add a new input for Biotic Suitability - predictors

1 Select Input

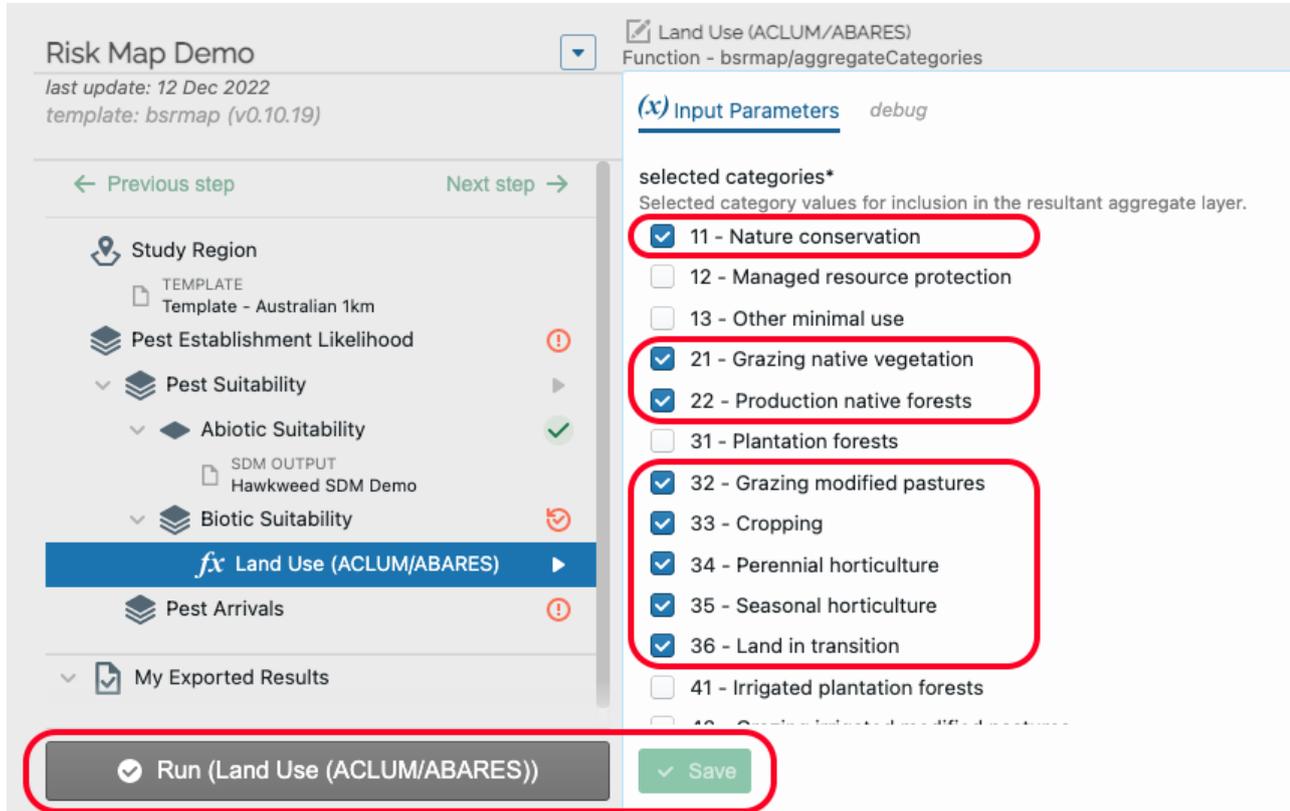
Add a new input for Biotic Suitability - predictors
Accepted types - image/tiff - image/geotiff

- ▼ Biosecurity Risk Mapping
 - fx Categories**
Aggregate any categorical data
 - fx Land Use (ACLUM/ABARES)**
Catchment Scale Land Use of Australia, ABARES, Secondary Categories, 2 arcsec (~50m)
 - fx NVIS Vegetation Types**
Australia, National Vegetation Information System (NVIS) V6.0
 - Australian NDVI (Normalised Difference Vegetation Index)**
October 2018 - March 2019
- ▼ Data Inputs
 - Choose from My Results**
Browse results from previous workflow experiments
 - Explore My Datasets**
Browse datasets previously uploaded or imported
 - Explore Curated Datasets**
Explore thousands of curated datasets available within the platform
 - Import / upload data**
Import data from third-party or upload your own





In this example with the Land Use layer the user can select which categories are suitable for the species they are modelling. After selecting the categories select **Save** and then **Run** the function to generate the result.



Risk Map Demo
last update: 12 Dec 2022
template: bsrmap (v0.10.19)

← Previous step Next step →

- Study Region
 - TEMPLATE
Template - Australian 1km
- Pest Establishment Likelihood !
- ▼ Pest Suitability
 - ▼ Abiotic Suitability ✓
 - SDM OUTPUT
Hawkweed SDM Demo
 - ▼ Biotic Suitability !
- fx Land Use (ACLUM/ABARES)** ▶
- Pest Arrivals !
- ▼ My Exported Results

Land Use (ACLUM/ABARES)
Function - bsrmap/aggregateCategories

(x) Input Parameters debug

selected categories*
Selected category values for inclusion in the resultant aggregate layer.

- 11 - Nature conservation
- 12 - Managed resource protection
- 13 - Other minimal use
- 21 - Grazing native vegetation
- 22 - Production native forests
- 31 - Plantation forests
- 32 - Grazing modified pastures
- 33 - Cropping
- 34 - Perennial horticulture
- 35 - Seasonal horticulture
- 36 - Land in transition
- 41 - Irrigated plantation forests
- 42 - Cropping and horticulture modified pastures

Run (Land Use (ACLUM/ABARES)) Save



Run the **Biotic Suitability** function once all the biotic layers have been added.

Risk Map Demo
last update: 12 Dec 2022
template: bsrmap (v0.10.19)

← Previous step Next step →

Study Region
TEMPLATE
Template - Australian 1km

Pest Establishment Likelihood ⓘ

▼ Pest Suitability ▶

▼ Abiotic Suitability ✓

SDM OUTPUT
Hawkweed SDM Demo

▼ **Biotic Suitability** ✓

fx Land Use (ACLUM/ABARES) ✓

NVIS Dataset Demo

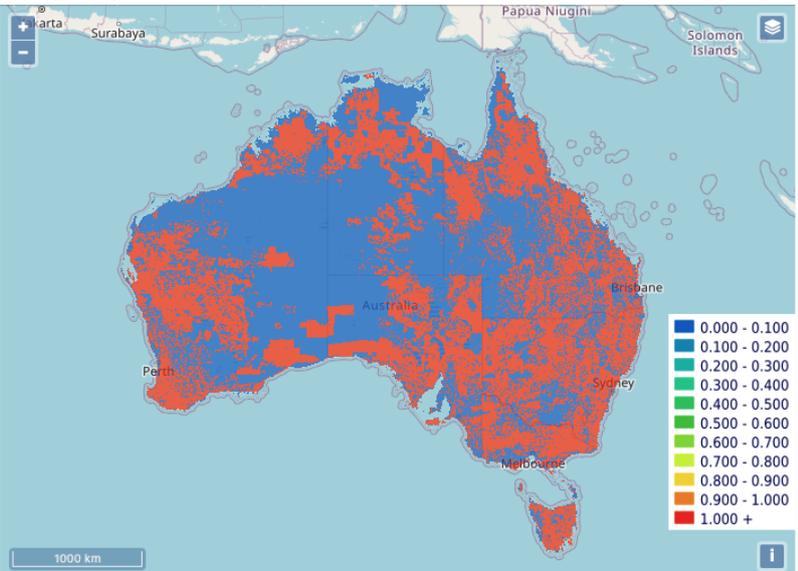
Pest Arrivals ⓘ

▼ My Exported Results

Biotic Suitability
Function - bsrmap/bioticSuitability

(fx) Input Parameters **Result** debug

All result data Biotic Suitability
biotic_suitability.tif

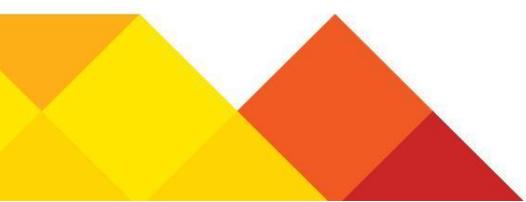


1000 km

Run (Biotic Suitability)
Function has run and Result is available

Export to 'My Results'

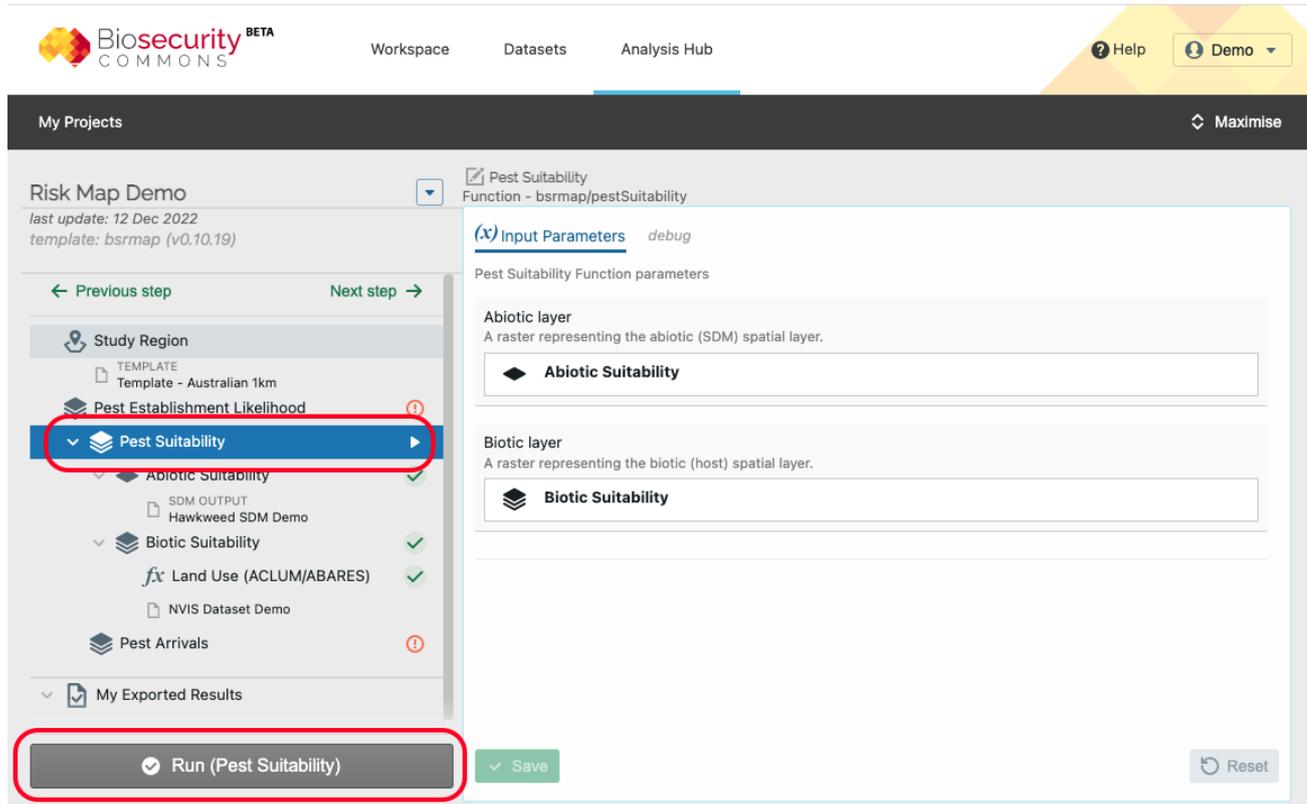
Reset





6.6 Pest Suitability

Once the abiotic and biotic suitability functions have been run the user needs to select **Pest Suitability** in the tree and run the Pest Suitability function.



The screenshot displays the Biosecurity Commons interface for a project named "Risk Map Demo". The top navigation bar includes "Workspace", "Datasets", and "Analysis Hub", along with "Help" and "Demo" buttons. The main content area is titled "My Projects" and shows a workflow tree on the left and a configuration panel on the right.

Workflow Tree (Left):

- Study Region
- TEMPLATE: Template - Australian 1km
- Pest Establishment Likelihood
- Pest Suitability** (highlighted with a red circle)
- Abiotic Suitability
- SDM OUTPUT: Hawkweed SDM Demo
- Biotic Suitability
- fx Land Use (ACLUM/ABARES)
- NVIS Dataset Demo
- Pest Arrivals
- My Exported Results

Configuration Panel (Right):

Pest Suitability Function - bsrmap/pestSuitability

Input Parameters (debug)

Pest Suitability Function parameters

Abiotic layer
A raster representing the abiotic (SDM) spatial layer.

Abiotic Suitability

Biotic layer
A raster representing the biotic (host) spatial layer.

Biotic Suitability

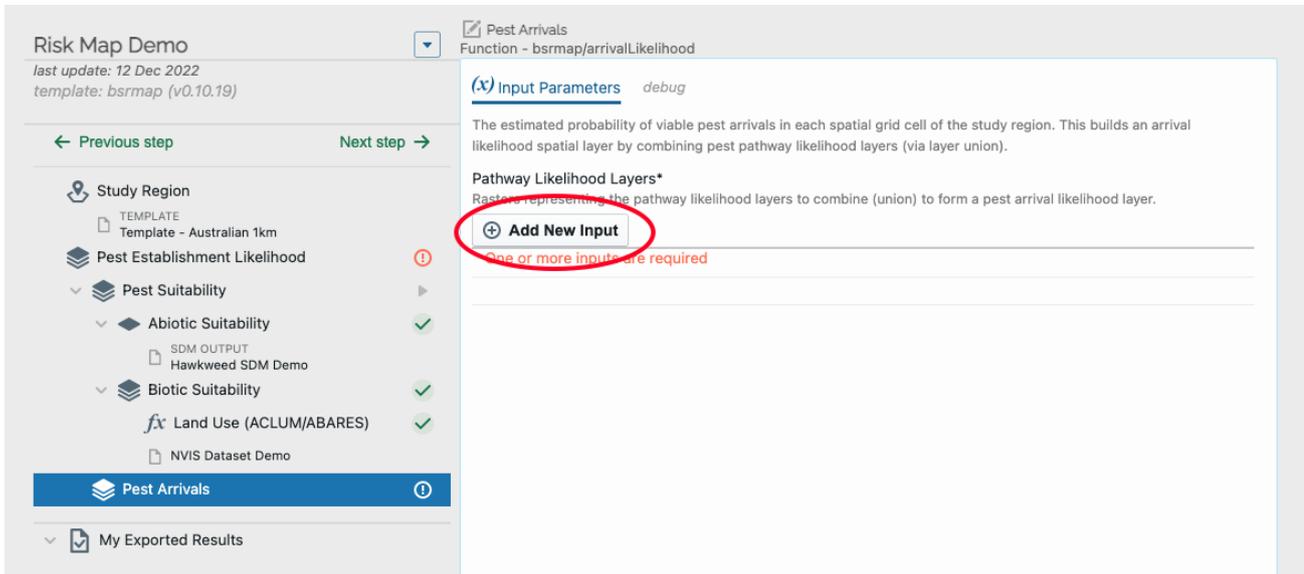
Buttons:

- Run (Pest Suitability)** (highlighted with a red circle)
- Save
- Reset



6.7 Pest Arrivals

Use the **Add New Input** button to add one or more Pest Arrival layers, representing the different modes of entry into Australia



Risk Map Demo
last update: 12 Dec 2022
template: bsrmap (v0.10.19)

← Previous step Next step →

- Study Region
 - TEMPLATE: Template - Australian 1km
- Pest Establishment Likelihood
- Pest Suitability
 - Abiotic Suitability
 - SDM OUTPUT: Hawkweed SDM Demo
 - Biotic Suitability
 - fx Land Use (ACLUM/ABARES)
 - NVIS Dataset Demo
- Pest Arrivals** ⓘ
- My Exported Results

Pest Arrivals
Function - bsrmap/arrivalLikelihood

(x) Input Parameters debug

The estimated probability of viable pest arrivals in each spatial grid cell of the study region. This builds an arrival likelihood spatial layer by combining pest pathway likelihood layers (via layer union).

Pathway Likelihood Layers*
Raster representing the pathway likelihood layers to combine (union) to form a pest arrival likelihood layer.

+ Add New Input

One or more inputs are required

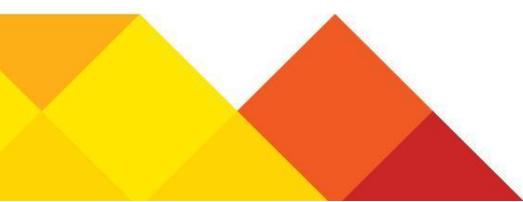
Users have the option of adding predefined curated functions for pest arrivals.

+ Add a new input for Pest Arrivals - pathway_likelihoood_layers

1 Select Input

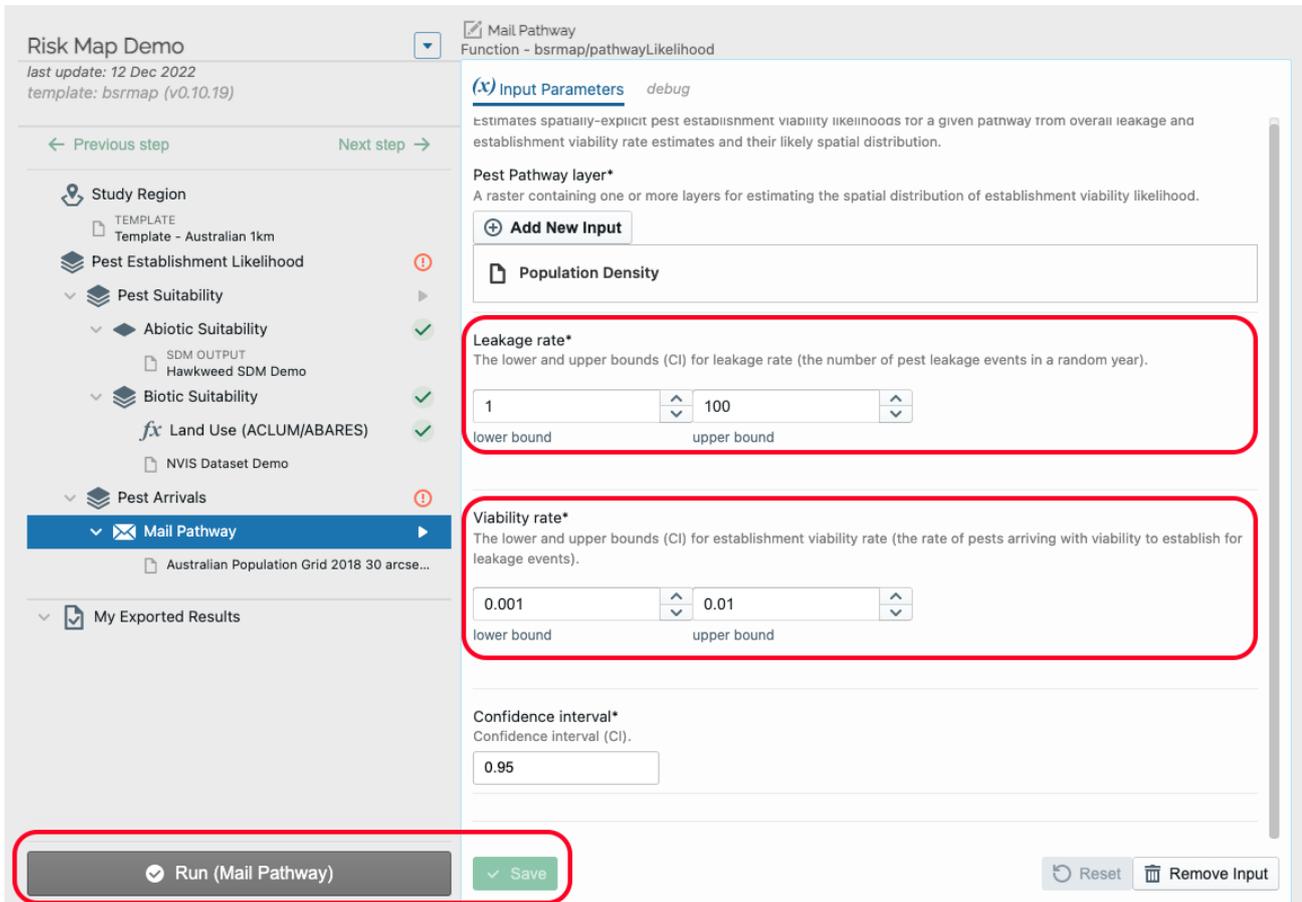
Add a new input for Pest Arrivals - pathway_likelihoood_layers
Accepted types - image/tiff - image/geotiff

- Biosecurity Risk Mapping
 - fx Generic Pathway
User defined Pest Pathway
 - Residents Pathway**
 - Tourists Pathway
 - fx Torres Straight Arrivals Pathway
 - Vessels Pathway
 - Containers Pathway
 - Mail Pathway
 - Agriculture Pathway
 - Machinery pathway
- Data Inputs
 - Choose from My Results
Browse results from previous workflow experiments
 - Explore My Datasets
Browse datasets previously uploaded or imported
 - Explore Curated Datasets
Explore thousands of curated datasets available within the platform





In this example with the Mail Pathway the user can select and adjust the **Leakage rate** and **Viability rate** parameters. After updating the parameters select **Save** and then **Run** the function to generate the result.



Risk Map Demo
last update: 12 Dec 2022
template: bsrmap (v0.10.19)

← Previous step Next step →

- Study Region
 - TEMPLATE
 - Template - Australian 1km
 - Pest Establishment Likelihood
 - Pest Suitability
 - Abiotic Suitability
 - Biotic Suitability
 - Land Use (ACLUM/ABARES)
 - NVIS Dataset Demo
 - Pest Arrivals
 - Mail Pathway**
 - Australian Population Grid 2018 30 arcse...
- My Exported Results

Mail Pathway
Function - bsrmap/pathwayLikelihood

Input Parameters *debug*

estimates spatially-explicit pest establishment viability likelihoods for a given pathway from overall leakage and establishment viability rate estimates and their likely spatial distribution.

Pest Pathway layer*
A raster containing one or more layers for estimating the spatial distribution of establishment viability likelihood.

Add New Input

Population Density

Leakage rate*
The lower and upper bounds (CI) for leakage rate (the number of pest leakage events in a random year).

1 100
lower bound upper bound

Viability rate*
The lower and upper bounds (CI) for establishment viability rate (the rate of pests arriving with viability to establish for leakage events).

0.001 0.01
lower bound upper bound

Confidence interval*
Confidence interval (CI).

0.95

Run (Mail Pathway) **Save** **Reset** **Remove Input**



6.8 Pest Establishment Likelihood

Once the **Pest Suitability** and **Pest Arrivals** functions have been run you will be able to run the overall **Pest Establishment Likelihood** function.

MEHW Risk Map Demo

last update: 6 Dec 2022
template: bsmmap (v0.10.19)

Mouse-ear-hawkweed demo

← Previous step Next step →

Study Region

TEMPLATE
Template - Australian 1km

- Pest Establishment Likelihood** ✓
- Pest Suitability ✓
 - Abiotic Suitability ✓
 - SDM OUTPUT
Pilosella officinarum ensemble
 - Biotic Suitability ✓
 - fx NVIS Vegetation Types ✓
 - fx Land Use (ACLUM/ABARES) ✓
 - Pest Arrivals ✓
 - Mail Pathway ✓
 - Australian Population Grid 2018 30 arcs...
 - Agriculture Pathway ✓
 - fx Agricultural Products ✓
 - fx Agriculture Land Use ✓
 - Tourists Pathway ✓

Run (Pest Establishment Likelihood)
Function has run and Result is available

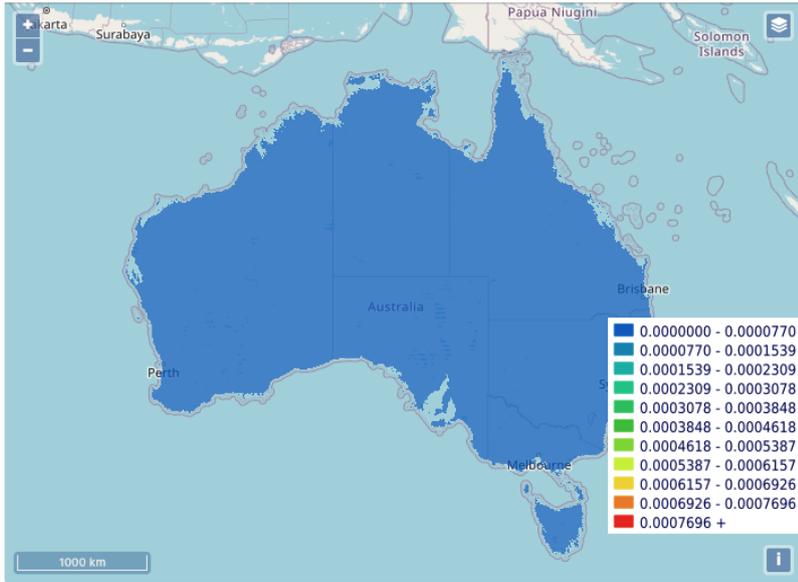
Export to 'My Results'

Reset

Pest Establishment Likelihood
Function - bsmmap/establishmentLikelihood

(x) Input Parameters **Result** debug

All result data Establishment Likelihood
establishment_likelihood.tif



1000 km





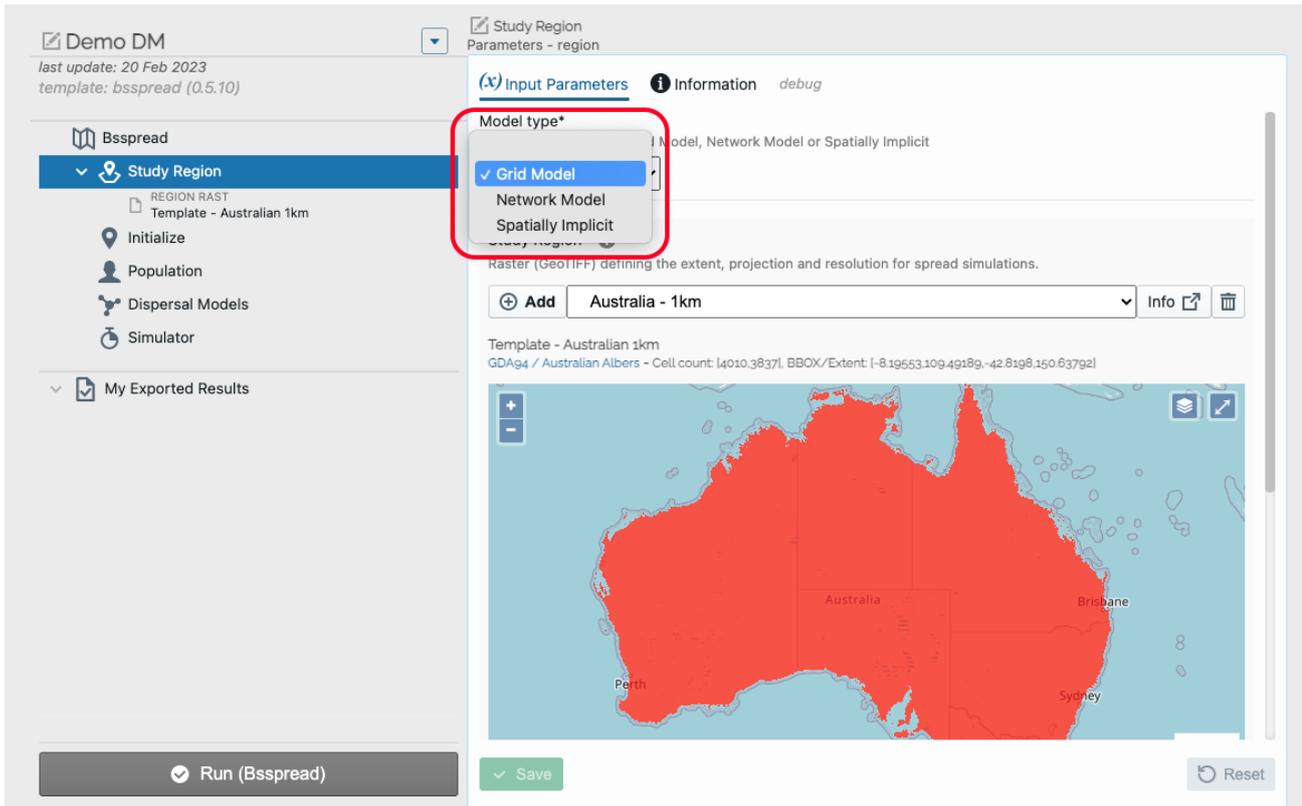
7 Dispersal (spread) Modelling

7.1 Introduction

This section provides a brief overview of the dispersal modelling workflow, for a detailed overview of the workflow please visit the [Dispersal Modelling workflow overview](#) support article.

7.2 Study Region

Select the **Model type** for your simulation from the drop-down list.

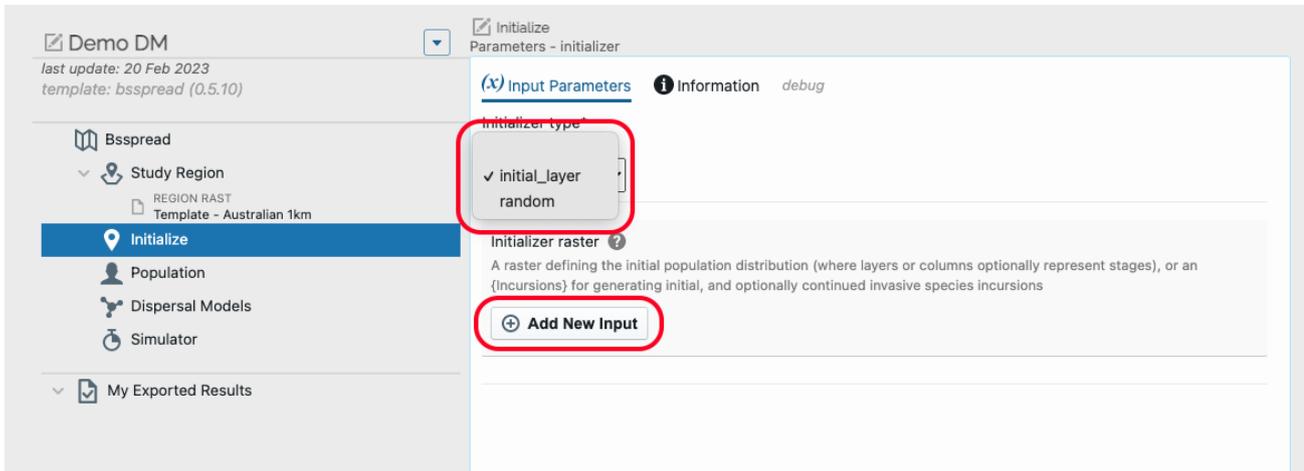


The screenshot displays the Bsspread web application interface. On the left, a sidebar contains navigation options: 'Bsspread', 'Study Region' (selected), 'REGION RAST' (with a sub-item 'Template - Australian 1km'), 'Initialize', 'Population', 'Dispersal Models', 'Simulator', and 'My Exported Results'. The main content area is titled 'Demo DM' and 'Study Region Parameters - region'. It features tabs for 'Input Parameters', 'Information', and 'debug'. A dropdown menu for 'Model type*' is open, showing three options: 'Grid Model' (selected), 'Network Model', and 'Spatially Implicit'. Below this, there is a section for 'Raster (GeoTIFF) defining the extent, projection and resolution for spread simulations.' with an 'Add' button and a dropdown menu currently set to 'Australia - 1km'. Further down, it shows 'Template - Australian 1km' with technical details: 'GDA94 / Australian Albers - Cell count: [4010,3837], BBOX/Extent: [-8.19553,109.49189,-42.8198,150.63792]'. A map of Australia is shown with a red overlay, and labels for 'Perth', 'Sydney', and 'Brisbane' are visible. At the bottom, there are buttons for 'Run (Bsspread)', 'Save', and 'Reset'.



7.3 Initialize

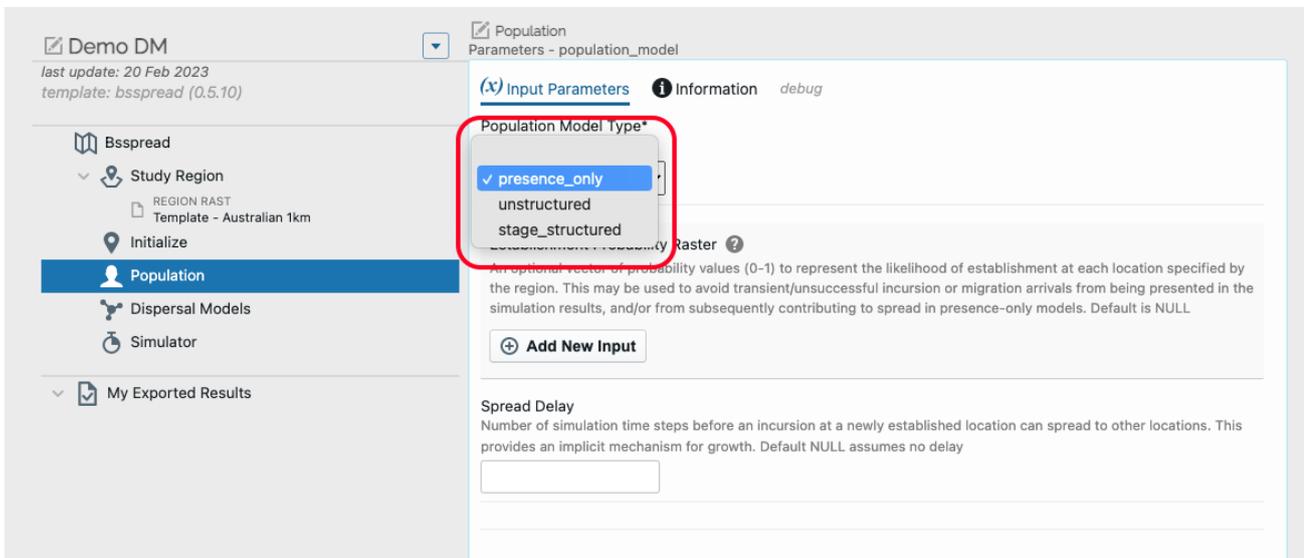
Select how to initialize the simulation. Initial layer allows you to seed the model with discrete locations, while the random option allows the user to randomly seed the model and simulate incursions based on a probability layer.



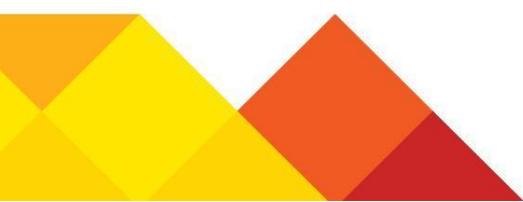
The screenshot shows the 'Initialize' configuration page for a 'Demo DM' simulation. The left sidebar has 'Initialize' selected. The main panel shows 'Input Parameters' for the 'initializer' section. A dropdown menu for 'Initializer type*' is open, with 'initial_layer' and 'random' options visible. Below this, there is a description for 'Initializer raster' and an 'Add New Input' button.

7.4 Population

Select the **Population Model Type** for the simulation.



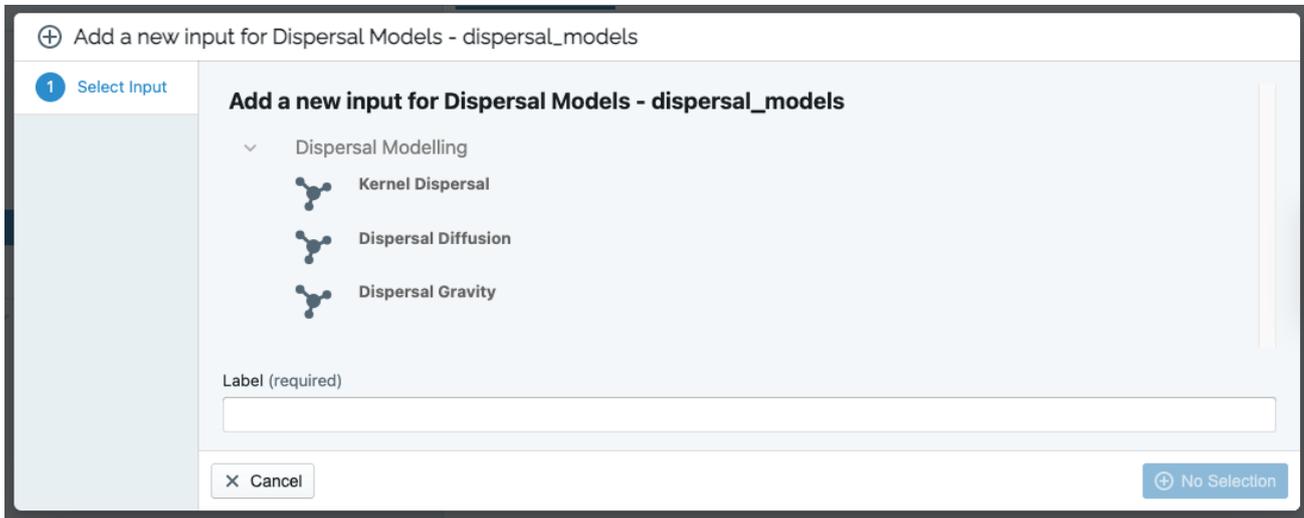
The screenshot shows the 'Population' configuration page for the same 'Demo DM' simulation. The left sidebar has 'Population' selected. The main panel shows 'Input Parameters' for the 'population_model' section. A dropdown menu for 'Population Model Type*' is open, with 'presence_only', 'unstructured', and 'stage_structured' options visible. Below this, there is a description for 'Probability Raster' and an 'Add New Input' button. Further down, there is a 'Spread Delay' section with a text input field.





7.5 Dispersal Models

Select the **Dispersal Models** for the simulation. Note that one or more models may be selected to represent different vectors for spread.



⊕ Add a new input for Dispersal Models - dispersal_models

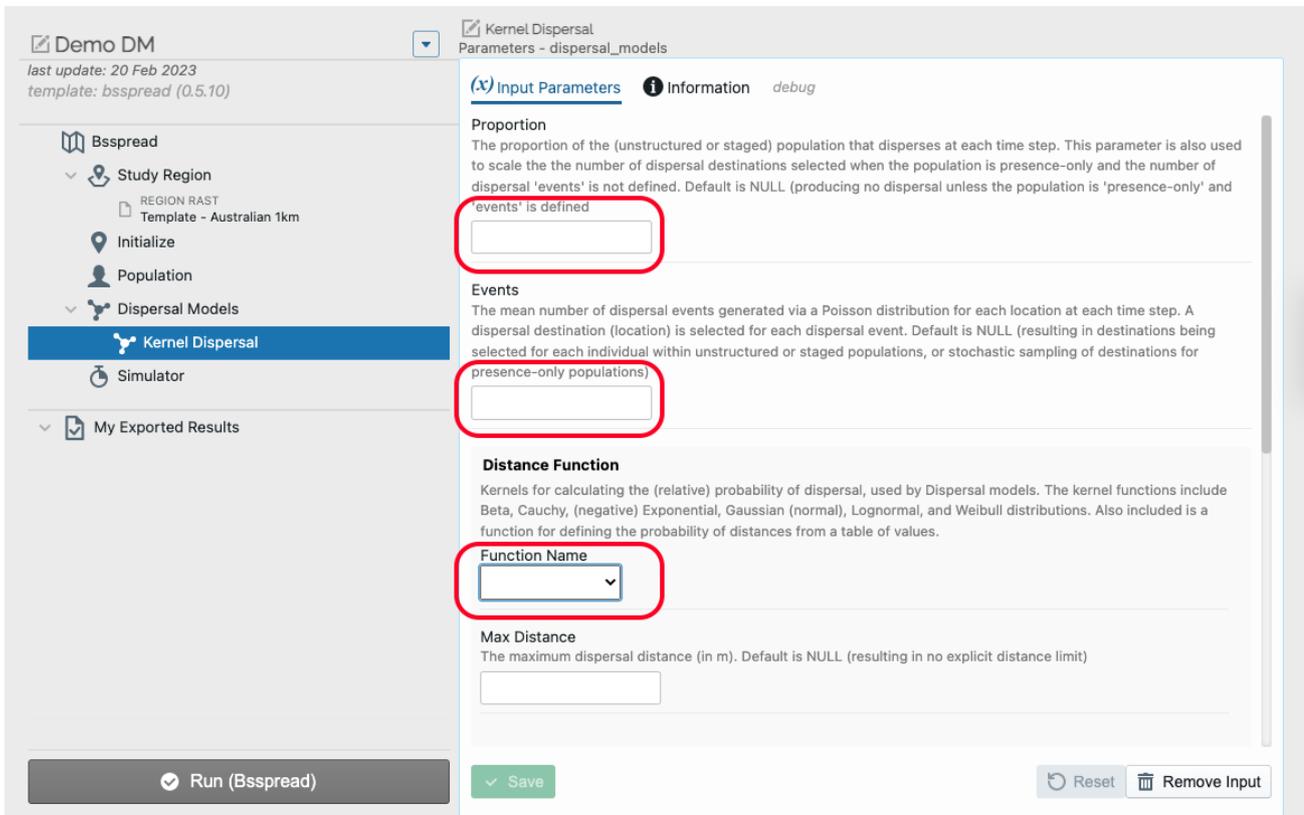
1 Select Input

Add a new input for Dispersal Models - dispersal_models

- Dispersal Modelling
 - Kernel Dispersal
 - Dispersal Diffusion
 - Dispersal Gravity

Label (required)

Enter the parameters for the selected dispersal.



Demo DM Kernel Dispersal Parameters - dispersal_models

last update: 20 Feb 2023
template: bsspread (0.5.10)

Bsspread

- Study Region
 - REGION RAST
Template - Australian 1km
- Initialize
- Population
- Dispersal Models
 - Kernel Dispersal**
 - Simulator
- My Exported Results

Proportion
The proportion of the (unstructured or staged) population that disperses at each time step. This parameter is also used to scale the the number of dispersal destinations selected when the population is presence-only and the number of dispersal 'events' is not defined. Default is NULL (producing no dispersal unless the population is 'presence-only' and 'events' is defined)

Events
The mean number of dispersal events generated via a Poisson distribution for each location at each time step. A dispersal destination (location) is selected for each dispersal event. Default is NULL (resulting in destinations being selected for each individual within unstructured or staged populations, or stochastic sampling of destinations for presence-only populations)

Distance Function
Kernels for calculating the (relative) probability of dispersal, used by Dispersal models. The kernel functions include Beta, Cauchy, (negative) Exponential, Gaussian (normal), Lognormal, and Weibull distributions. Also included is a function for defining the probability of distances from a table of values.

Function Name

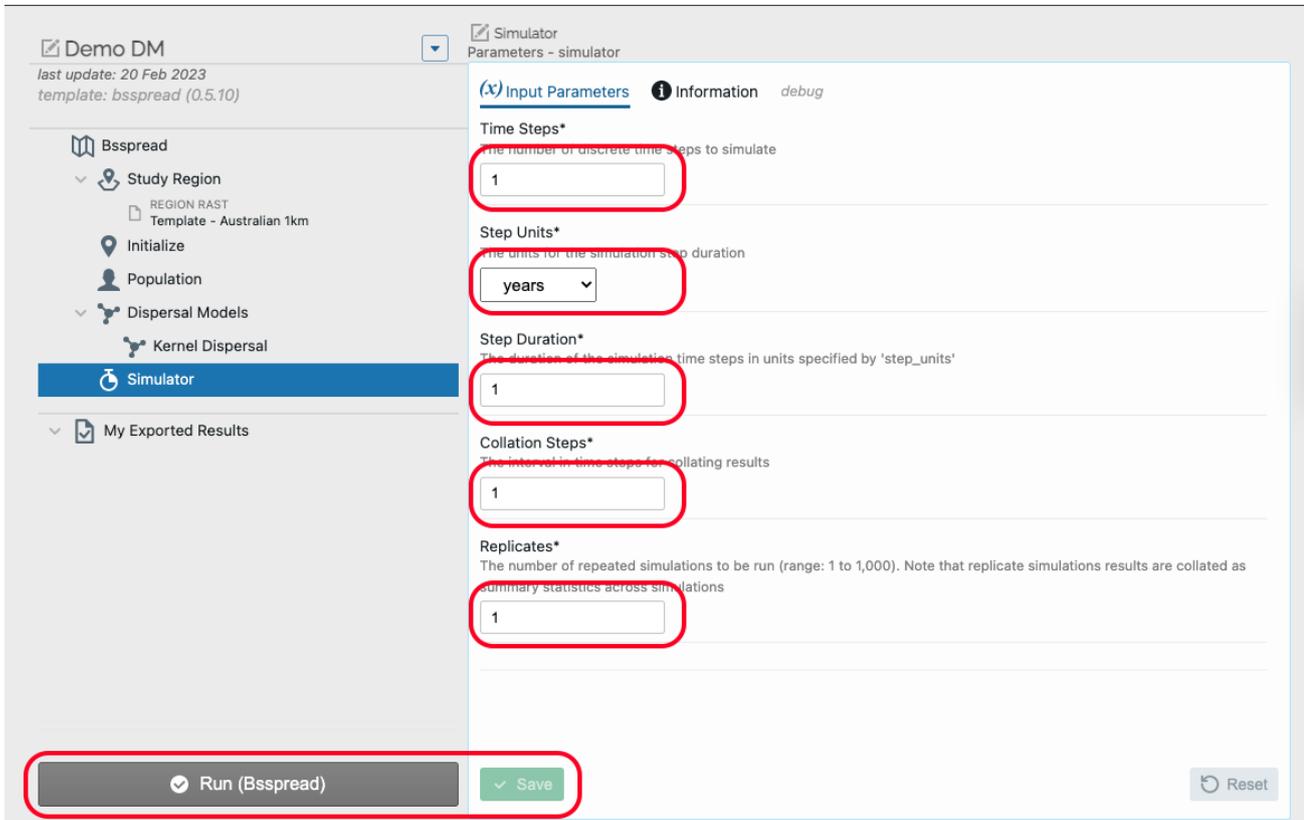
Max Distance
The maximum dispersal distance (in m). Default is NULL (resulting in no explicit distance limit)





7.6 Simulator

Enter the parameters controlling the execution of the simulation. After updating the parameters select **Save** and then **Run** the simulation to generate the results.



Demo DM
last update: 20 Feb 2023
template: bsspread (0.5.10)

Bsspread

- Study Region
 - REGION RAST
 - Template - Australian 1km
- Initialize
- Population
- Dispersal Models
 - Kernel Dispersal
- Simulator**
- My Exported Results

Simulator
Parameters - simulator

(X) Input Parameters **i Information** *debug*

Time Steps*
The number of discrete time steps to simulate

Step Units*
The units for the simulation step duration

Step Duration*
The duration of the simulation time steps in units specified by 'step_units'

Collation Steps*
The interval in time steps for collating results

Replicates*
The number of repeated simulations to be run (range: 1 to 1,000). Note that replicate simulations results are collated as summary statistics across simulations

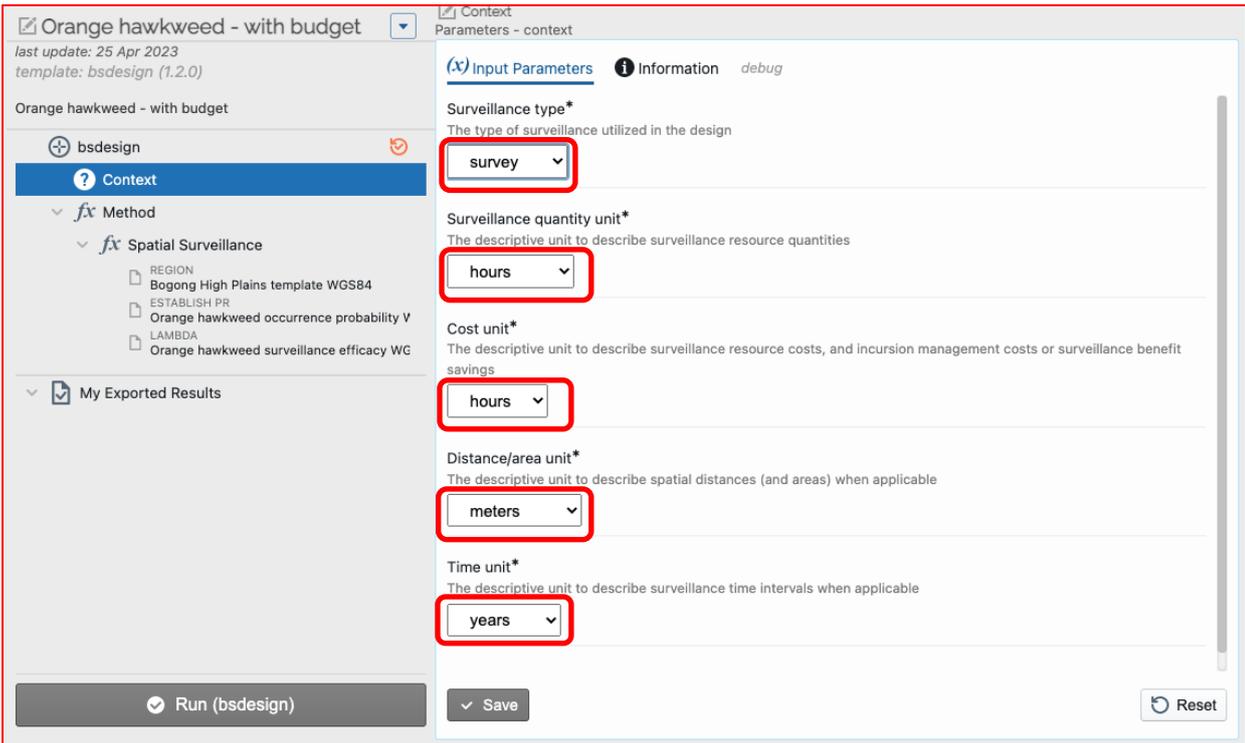


8 Surveillance Design

8.1 Introduction

This section provides a brief overview of the surveillance design workflow, for a detailed overview of the workflow please visit the Surveillance Design support article.

8.2 Define the context of the surveillance project



The screenshot displays the 'Context' configuration interface for a surveillance project titled 'Orange hawkweed - with budget'. The interface is divided into a left sidebar and a main content area.

Left Sidebar:

- Project name: Orange hawkweed - with budget
- Last update: 25 Apr 2023
- Template: bsdesign (1.2.0)
- bsdesign (with a refresh icon)
- Context** (selected)
- Method
 - Spatial Surveillance
 - REGION: Bogong High Plains template WGS84
 - ESTABLISH_PR: Orange hawkweed occurrence probability V
 - LAMBDA: Orange hawkweed surveillance efficacy WC
- My Exported Results

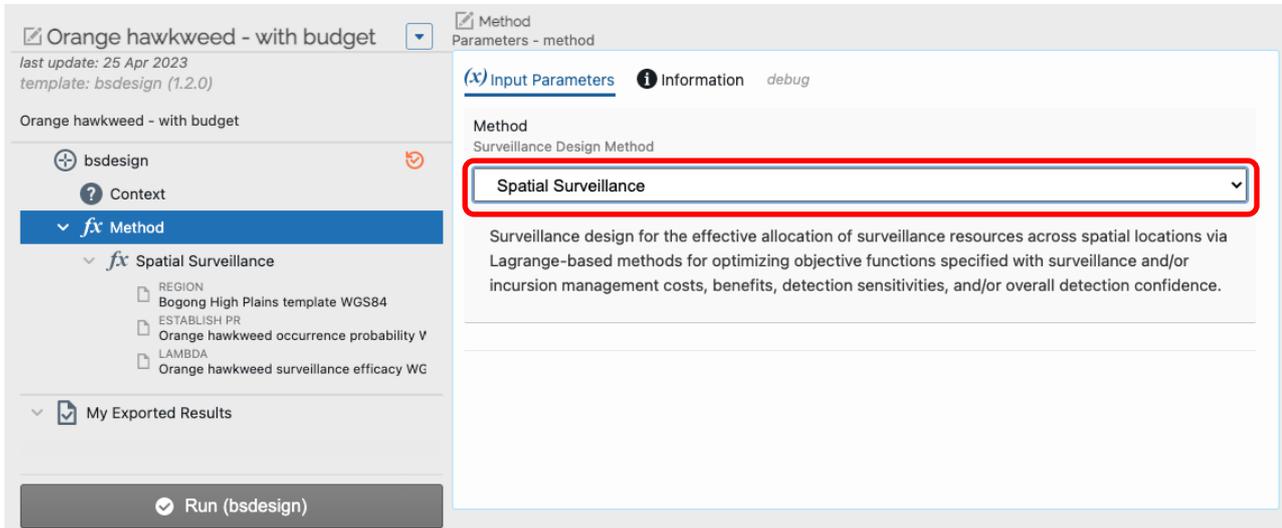
Main Content Area (Parameters - context):

- Input Parameters** (selected), Information, debug
- Surveillance type***: The type of surveillance utilized in the design. Dropdown menu: **survey** (highlighted with a red box).
- Surveillance quantity unit***: The descriptive unit to describe surveillance resource quantities. Dropdown menu: **hours** (highlighted with a red box).
- Cost unit***: The descriptive unit to describe surveillance resource costs, and incursion management costs or surveillance benefit savings. Dropdown menu: **hours** (highlighted with a red box).
- Distance/area unit***: The descriptive unit to describe spatial distances (and areas) when applicable. Dropdown menu: **meters** (highlighted with a red box).
- Time unit***: The descriptive unit to describe surveillance time intervals when applicable. Dropdown menu: **years** (highlighted with a red box).

Buttons: Run (bsdesign), Save, Reset.



8.3 Select the surveillance design method



The screenshot displays the 'Orange hawkweed - with budget' project page. On the left sidebar, the 'Method' section is expanded to show 'Spatial Surveillance' as the selected option. The main content area shows the 'Method' details for 'Surveillance Design Method', with 'Spatial Surveillance' selected in a dropdown menu. Below the dropdown, a description reads: 'Surveillance design for the effective allocation of surveillance resources across spatial locations via Lagrange-based methods for optimizing objective functions specified with surveillance and/or incursion management costs, benefits, detection sensitivities, and/or overall detection confidence.'

Orange hawkweed - with budget

last update: 25 Apr 2023
template: bsdesign (1.2.0)

Orange hawkweed - with budget

- bsdesign
- Context
- Method**
 - Spatial Surveillance**
 - REGION Bogong High Plains template WGS84
 - ESTABLISH PR Orange hawkweed occurrence probability V
 - LAMBDA Orange hawkweed surveillance efficacy WG
- My Exported Results

Run (bsdesign)

Method
Parameters - method

[Input Parameters](#) [Information](#) [debug](#)

Method
Surveillance Design Method

Spatial Surveillance

Surveillance design for the effective allocation of surveillance resources across spatial locations via Lagrange-based methods for optimizing objective functions specified with surveillance and/or incursion management costs, benefits, detection sensitivities, and/or overall detection confidence.



8.4 Provide inputs for the spatial surveillance optimisation problem

Orange hawkweed - with budget

last update: 25 Apr 2023
template: bsdesign (1.2.0)

Orange hawkweed - with budget

- bsdesign
- Context
- Method
- Spatial Surveillance
 - REGION
 - Bogong High Plains template WGS84
 - ESTABLISH PR
 - Orange hawkweed occurrence probability V
 - LAMBDA
 - Orange hawkweed surveillance efficacy WG
- My Exported Results

Spatial Surveillance
Parameters - parameters

(x) Input Parameters Information debug

Region*
The region for surveillance design

+ Add

Info
✕

Establishment probability*
Probability values to represent the likelihood of pest establishment at each spatial location specified by 'region'. Values are assumed to be relative when their maximum is greater than 1, or an attribute relative=TRUE is attached to the parameter

+ Add

Info
✕

Efficacy (lambda)*
Efficacy or detection rates for each spatial location specified by 'region', such that the probability of detecting an incursion when present at apart can be expressed via $pr(\text{detect}|\text{presence}) = 1 - \exp(-\lambda \cdot \text{allocation})$, for a given allocation of surveillance resources

+ Add

Info
✕

Optimisation strategy*
The strategy used for finding an effective surveillance resource allocation. One of (minimum) 'cost', (maximum) 'benefit', (maximum) 'detection' sensitivity (up to 'confidence' level when specified)

Management cost*
Represents estimated management costs for when the incursion is detected and undetected

Detected*

Undetected*

Allocated surveillance cost
Cost per unit of allocated surveillance resources at each spatial location specified by divisions. Default is NULL. Units should be consistent with the 'cost_unit' parameter specified in the Context

+ Add New Input

Unit 'hours'

✓ Run (bsdesign)

✓ Save

↺ Reset

✕ Remove Input





Provide inputs for the spatial surveillance optimisation problem (cont.)

My Exported Results

Fixed cost
Fixed costs, such as travel costs or time, at each spatial location specified by divisions. Default is NULL.
Units should be consistent with 'alloc_cost' when specified. Otherwise the units should be consistent with the 'surv_qty_unit' parameter specified in the Context.

Unit 'hours'

Constraint*
The constraint for the resource allocation in the surveillance design. If budget is selected units should be consistent with allocated surveillance cost when specified. Otherwise the units should be consistent with the surveillance quantity unit parameter specified in the context form. If confidence is selected enter the desired (minimum) system sensitivity or detection confidence of the surveillance design (e.g. 0.95).

Surveillance Budget*

Unit 'hours'

Minimum Allocation
Minimum permissible allocated surveillance resource quantities at each spatial location. Used to avoid impractically low allocation quantities.

A logical to indicate that the allocated surveillance resource quantities at each 'region' part (location, category, etc.) specified by 'region' should be discrete integers. Used to allocate discrete surveillance units, such as traps or detectors. Default is FALSE for continuous resources quantities, such as survey hours

Discrete Allocation

Run when inputs are selected

