



condatis



# *Condatis Case Studies for FLOW & DROPPING analyses*

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INSTITUT PERTANIAN BOGOR, JAVA • 28<sup>TH</sup> NOVEMBER 2018

# Activity

## **FLOW**

*As the climate gets warmer, which routes will heathland populations take to move from habitat patches in the south of England to those in the north?*

- Perform a **Flow** analysis
- Interpret the results

## **DROPPING**

*Given a desire and resources to protect more of Sabah's forest, which are the currently unprotected forest habitats that are a priority to protect to ensure long-term connectivity between lowland protected areas (PAs) and Mount Kinabalu?*

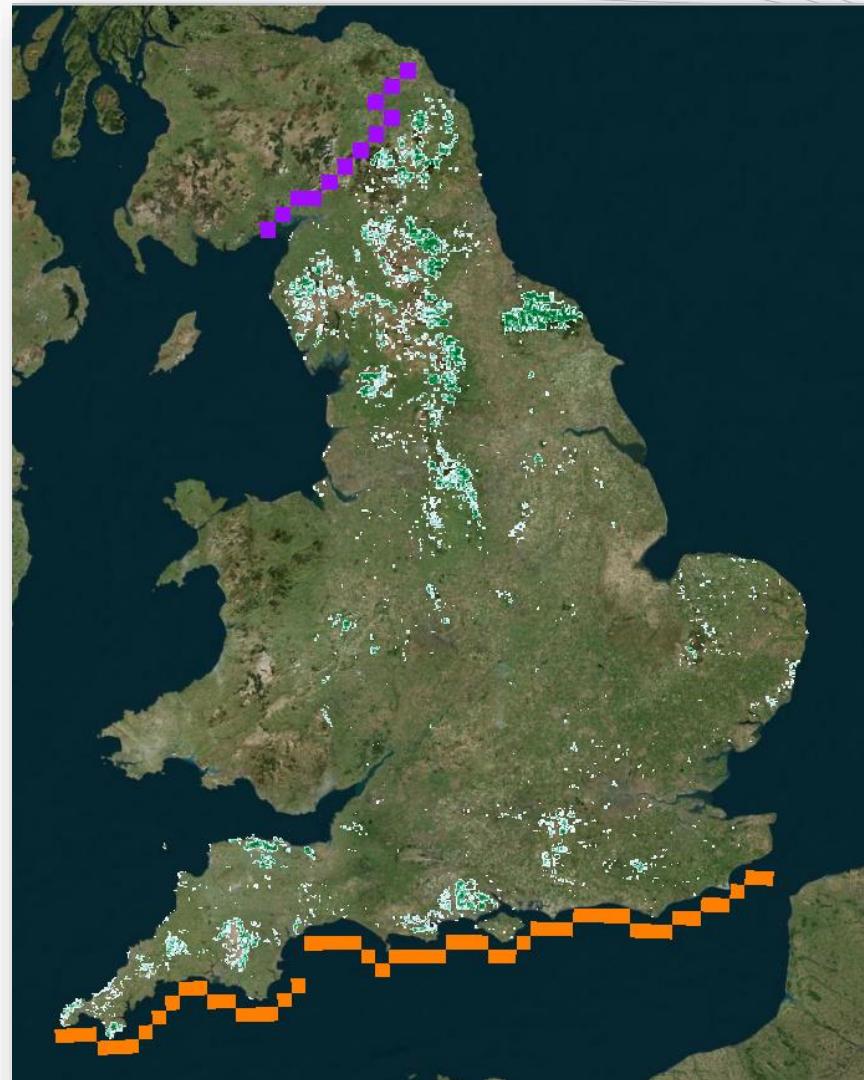
- Perform a **Dropping** analysis
  - Interpret the results
- Decide which areas to prioritise for formal protection

# **FLOW – Connecting up habitat in England**

Conservation & Management Qs:

*As the climate gets warmer,  
**which routes** will biodiversity of  
heathlands take to move from the  
south of England to the north?*

*Which are the **most important**  
migration routes between the  
south and north?*



Heathland habitat across England, with *Source* and *Target* locations shown

# Inputs for Condatis – FLOW analysis

Data/files	Name
File package	CaseStudies → Input_data → Flow-UK
Habitat layer*	HeathEng1km.tif
Source/target layer*	Eng_SN.tif
Reproductive rate	2000 individuals per km <sup>2</sup>
Dispersal distance	5km / 10km
Condatis “job” name	e.g. HeathEng5kmFlow

\*CondatisRasterPrep  
PDF guidelines in data  
package



Look at your input layers  
in GIS before starting

# Flow analysis

1. Open Condatis webpage & sign in

The screenshot shows the Condatis login page. At the top, there is a navigation bar with links for 'CONDATIS PROJECT', 'HELP', and 'YOUR ACCOUNT'. Below the navigation bar, there is a logo for 'condatis' and a tagline 'bigger, better and more joined-up habitat networks'. The main heading is 'Welcome to Condatis Version 1.0'. A red box highlights the 'Please Sign in' form, which contains fields for 'User Name or Email Address' and 'Password', and a 'Submit' button. A red arrow points to the 'Password' input field. Below the form, a link says 'Forgotten your password? Click [here](#) for help'. At the bottom, there is a section for new users with the text 'New to Condatis? Then please register [here](#)'. The footer contains links for 'TERMS AND CONDITIONS', 'PRIVACY DECLARATION', and '© CONDATIS 2018'.

<https://webapp.condatis.org.uk/>

# Flow analysis

## 2. Create New job

 condatis

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### Job Management

Job title	Date Presented	Analysis Type	Status	Progress	Results	Details
SabahPA3Flow	2018-06-27	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA4Flow	2018-06-27	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA1Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA1Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA2Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA3Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA3Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA3Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA2Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA4Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2FLOW	2018-07-12	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2FLOW	2018-07-17	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Drop	2018-07-17	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Dropflowbased	2018-07-17	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Dropflowbased(2)	2018-09-05	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>

[View All](#) [Create New job](#)

Create New job

# Flow analysis

## 3. Decide on type of analysis: *Flow* or *Dropping* analysis

The screenshot shows the Condatis Create Job interface. It displays two forms side-by-side:

**Job Creation** (Left Form):

- Username: Lydia Cole
- Email: lydia.cole@liverpool.ac.uk
- \*Job Title: Heath
- \*Reproductive Rate (R): 1000
- \*Dispersal Distance (km): 5
- Include Prioritization:  Habitat Layer:
- \*Source and Target Layer:
- Email on completion?

**Create Job** (Right Form):

- Username: Lydia Cole
- Email: lydia.cole@liverpool.ac.uk
- \*Job Title: Heath
- \*Reproductive Rate (R): 1000
- \*Dispersal Distance (km): 5
- Include Prioritization:   
\*Habitat Layer:  ?
- \*Source and Target Layer:  ?
- \*Prioritisation Layer:  ?
- Stages: 10 (rough guide) ?
- Stage Type: Number based (equal number of cells drc) ?
- Email on completion?  \*Required Fields

A large bracket on the right side of the 'Create Job' form is labeled "Dropping".

# Flow analysis

## 4. Fill out data input boxes & submit “Job”

Screenshot of the CONDATIS web application showing the "Create Related" job submission form.

The form fields are as follows:

- Create Related Job**
- Username:** Lydia Cole
- Email:** lydia.cole@liverpool.ac.uk
- Job Title:** HeathEng5km
- Reproductive Rate (R):** 2000
- Dispersal Distance:** 5
- Include Prioritization by Dropping:**
- Habitat Layer:**  HeathEng1km.tif
- Source and Target Layer:**  Eng\_SN.tif
- Email on completion?**

A large pink arrow points to the "Email on completion?" checkbox.

At the bottom left is a **Submit** button.

At the bottom right are links to **TERMS AND CONDITIONS**, **PRIVACY DECLARATION**, and **© CONDATIS 2018**.

# Flow analysis

## 5. Your position in the Queue will be shown

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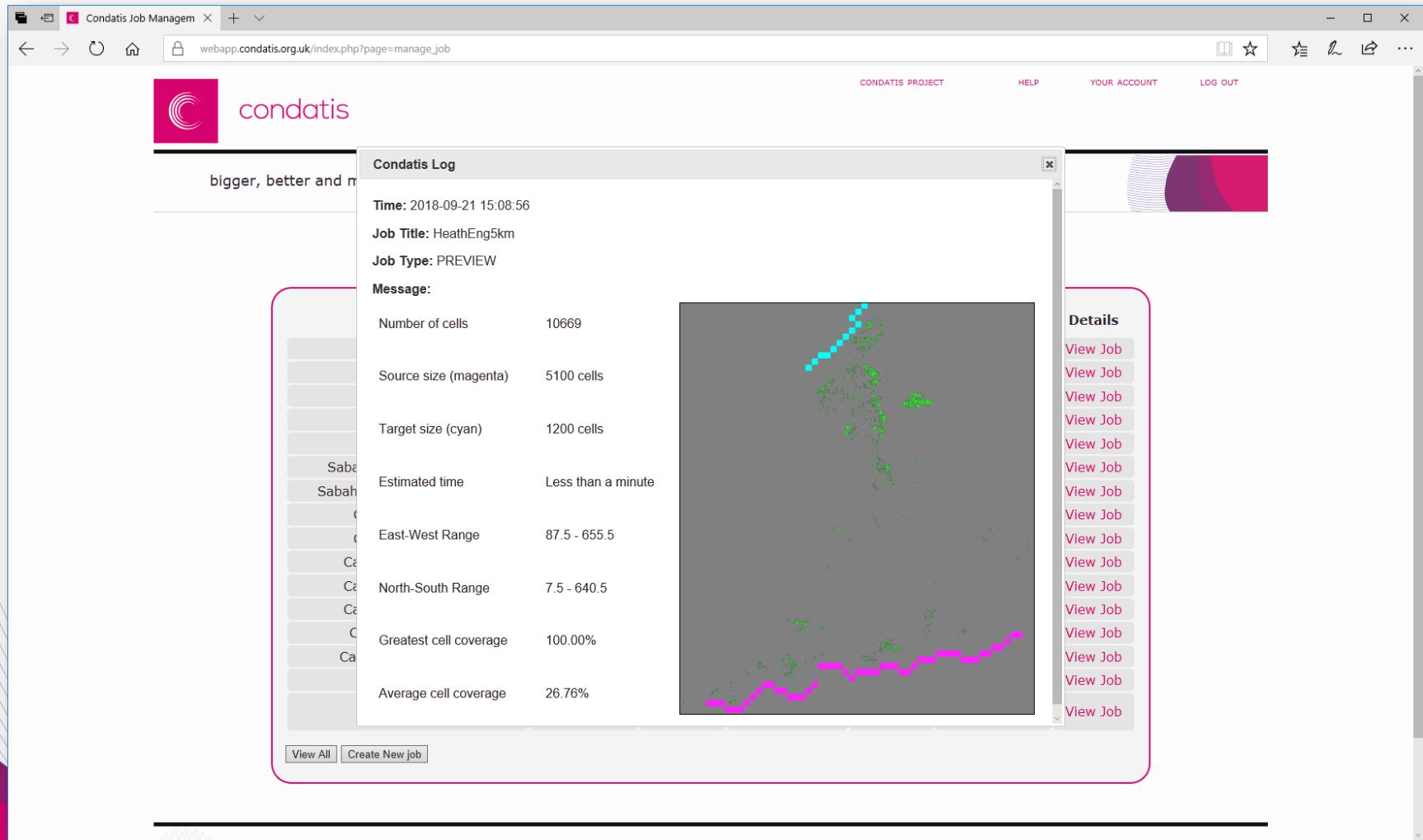
### Job Management

Job title	Date Presented	Analysis Type	Status	Progress	Results	Details
SabahPA4Flow	2018-06-27	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA1Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA1Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA2Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA3Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA3Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA3Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA2Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA4Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2FLOW	2018-07-12	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2FLOW	2018-07-17	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Drop	2018-07-17	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Dropflowbased	2018-07-17	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Dropflowbased(2)	2018-09-05	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
CalcEng2kmFlow	2018-09-05	Flow only	PREPARING Queue Pos: 1	0%	Not available	<a href="#">View Job</a>

[View All](#) [Create New job](#)

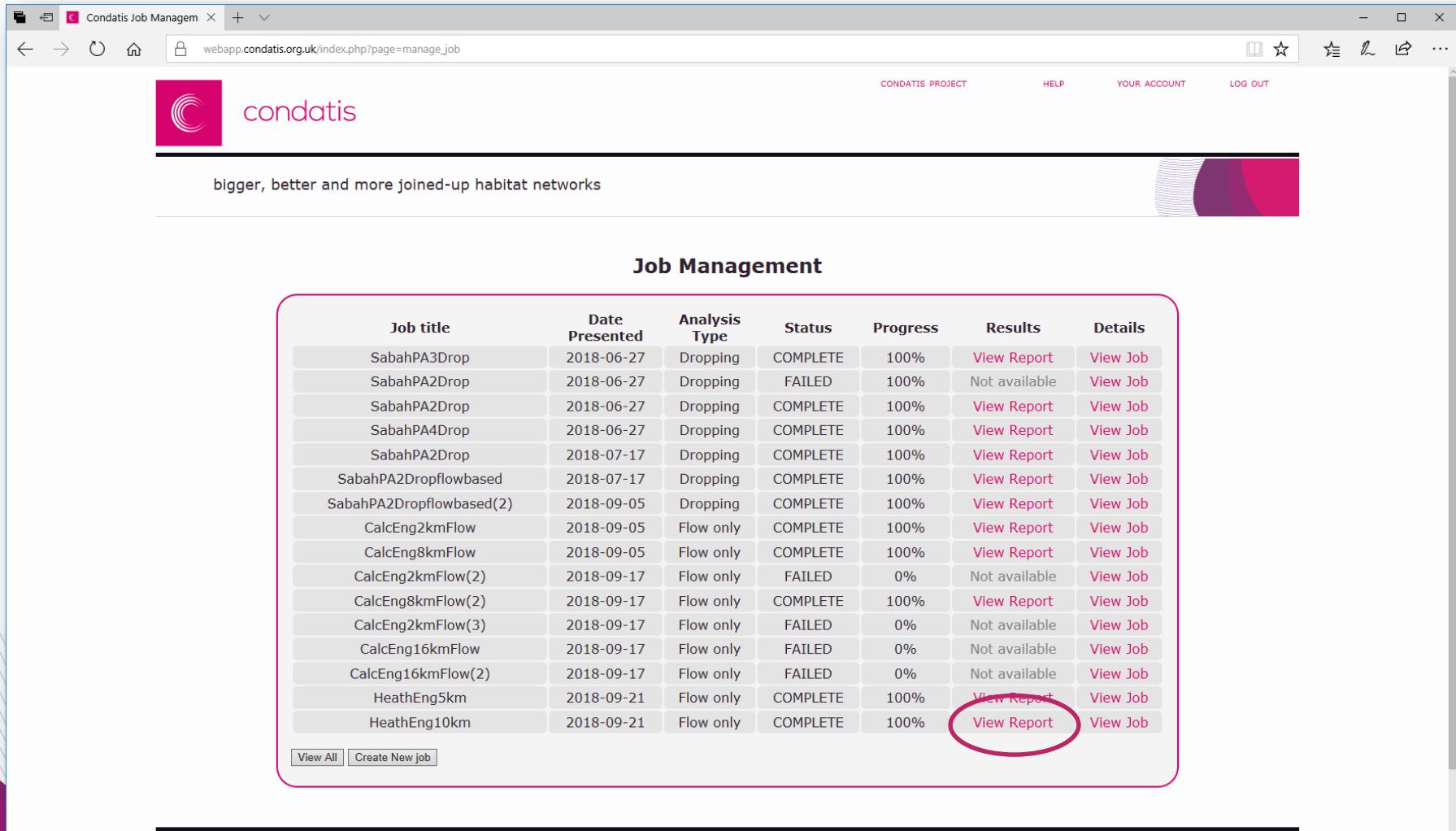
# Flow analysis

5. A window will pop up, showing the key parameters of the Job; these can also be viewed by clicking on “View Job”



# Flow analysis

## 6. Open Results html page



The screenshot shows a web browser window titled "Condatis Job Management". The URL in the address bar is "webapp.condatis.org.uk/index.php?page=manage\_job". The page features the Condatis logo and a tagline "bigger, better and more joined-up habitat networks". The main content is a "Job Management" section containing a table of job results. The table has columns: Job title, Date Presented, Analysis Type, Status, Progress, Results, and Details. Most rows have "View Report" and "View Job" links in the Details column. The last row, "HeathEng10km", has "View Report" and "View Job" links in the Details column, with the "View Report" link circled in red.

Job title	Date Presented	Analysis Type	Status	Progress	Results	Details
SabahPA3Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Drop	2018-06-27	Dropping	FAILED	100%	Not available	<a href="#">View Job</a>
SabahPA2Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA4Drop	2018-06-27	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Drop	2018-07-17	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Dropflowbased	2018-07-17	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
SabahPA2Dropflowbased(2)	2018-09-05	Dropping	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
CalcEng2kmFlow	2018-09-05	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
CalcEng8kmFlow	2018-09-05	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
CalcEng2kmFlow(2)	2018-09-17	Flow only	FAILED	0%	Not available	<a href="#">View Job</a>
CalcEng8kmFlow(2)	2018-09-17	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
CalcEng2kmFlow(3)	2018-09-17	Flow only	FAILED	0%	Not available	<a href="#">View Job</a>
CalcEng16kmFlow	2018-09-17	Flow only	FAILED	0%	Not available	<a href="#">View Job</a>
CalcEng16kmFlow(2)	2018-09-17	Flow only	FAILED	0%	Not available	<a href="#">View Job</a>
HeathEng5km	2018-09-21	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>
HeathEng10km	2018-09-21	Flow only	COMPLETE	100%	<a href="#">View Report</a>	<a href="#">View Job</a>

[View All](#) [Create New job](#)

# Flow analysis

## 6. Open Results html page

The screenshot shows a web browser window displaying a Condatis analysis results report. The URL in the address bar is [http://webapp.condatis.org.uk/uploads/701\\_wmzsrozohlahy/HeathEng5km.html](http://webapp.condatis.org.uk/uploads/701_wmzsrozohlahy/HeathEng5km.html).

**CONDATIS PROJECT** **HELP**

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### Condatis analysis results report for job: HeathEng5km Analysis Type: Flow Only

Name	Lydia Cole
Email	lydia.cole@liverpool.ac.uk
Date presented	09/21/2018 15:08:34
Time taken for analysis	0:00:55

#### Input Data and parameters

Habitat layer	HeathEng1km.tif
Source and Target layer	Eng_SN.tif
Reproductive Rate (individuals per km <sup>2</sup> )	2000.0
Dispersal Distance (km)	5.0

#### Processes

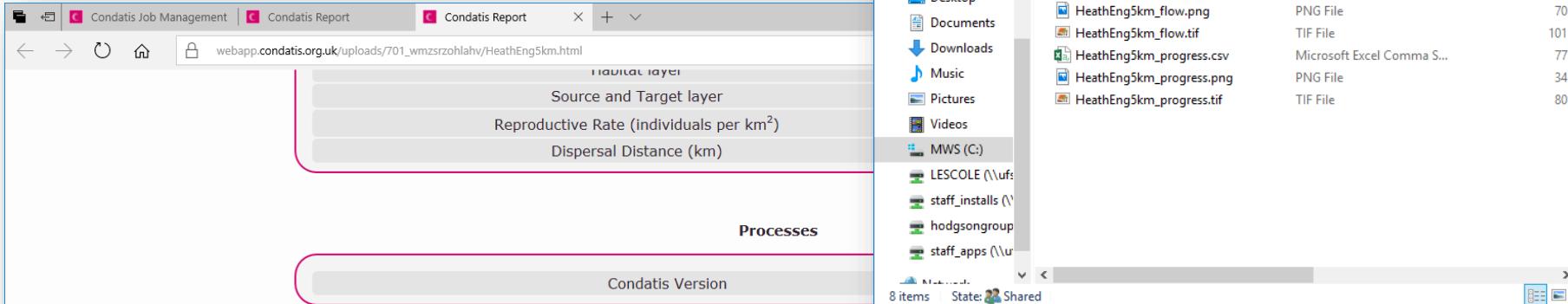
Condatis Version	1.00
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#### Results

**Output files:**  
All files included in zip file [HeathEng5km\\_results.zip](#) (Click to download)

# Flow analysis

## 7. Download zip file



The screenshot shows a web browser window with the URL [webapp.condatis.org.uk/uploads/701\\_wmzsrzohlahv/HeathEng5km.html](http://webapp.condatis.org.uk/uploads/701_wmzsrzohlahv/HeathEng5km.html). The page content includes:

- Parameters:
  - Initial layer
  - Source and Target layer
  - Reproductive Rate (individuals per km<sup>2</sup>)
  - Dispersal Distance (km)
- Processes
- Condatis Version

Below the page content, there is a 'Results' section with the heading 'Output files:' and the text 'All files included in zip file [HeathEng5km\\_results.zip](#) (Click to download)'. This link is highlighted with a red oval.

**Results**  
**Output files:**  
All files included in zip file [HeathEng5km\\_results.zip](#) (Click to download)

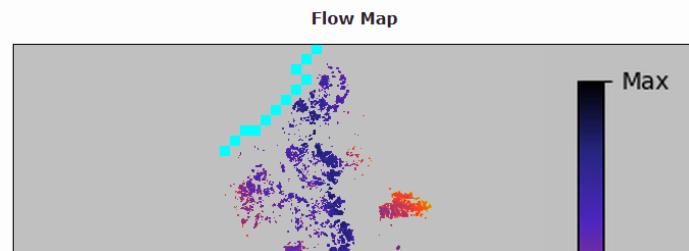
- i. HeathEng5km.csv
- ii. HeathEng5km\_flow.tif
- iii. HeathEng5km\_progress.tif

The *Help Documentation* on the Condatis website provides further information to assist with the interpretation of Condatis outputs and with troubleshooting, and can be accessed [here](#).

Maps shown in .tif files can be viewed using a mapping platform, for example [QGIS](#)(free and open source) or [ArcGIS](#).

### Summary of results.

The overall speed of movement of the modelled species from source to target in this landscape is 6.056567e-06. The lower the speed, the longer the time it would take for the first colonisation of the target. The relationship between Condatis' speed and the rate of movement in population simulations is very significant, but not exact or linear (Hodgson *et al.*, 2012). If speed is <<1 it probably indicates that many generations would be needed for the species to reach the target. If the speed is >>1 it may indicate that there are many alternative routes which all have a possibility of leading to the first successful target colonisation.



# Flow analysis

## 8. Create Related job

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### Manage Job

Job Details	
Username	Lydia Cole
Email	lydia.cole@liverpool.ac.uk
Job Title	SabahPA2Dropflowbased
Reference Id	449
Status	COMPLETE
Progress	100%
Presented	2018-07-17 06:07:47
Completed	Not available
Reproductive Rate	2000
Dispersal Distance	4
Analysis Type	Dropping
Habitat Layer	Forestundrop.tif
Source and Target Layer	SourceTarget2.tif
Prioritisation Layer	Forestdrop.tif
Stages	10
Stage Type	Flow_Based
Completion Notification	Off

[View Logs](#) [Create Related](#) [Delete Job](#)

[Back to Manage Jobs](#)

# CONNECTING UP HABITAT IN ENGLAND – *Flow analysis*

*As the climate gets warmer, which routes will populations of heathlands use to move from the south of England to the north?*

1. Open Condatis webpage & sign in
2. Create new job
3. Decide on type of analysis, i.e. Flow only
4. Fill out data input boxes
5. Check job information
6. Open Results html page
7. Download zip file
8. Create related job

Data/files	Name
File package	Flow-UK
Habitat layer	HeathEng1km.tif
Source/target layer	Eng_SN.tif
Reproductive rate	2000 individuals per km <sup>2</sup>
Dispersal distance	5km / 10km
Condatis “job” name	e.g. HeathEng5kmFlow

# Interpreting results

## - Flow

Just in case you get an error message.....

Screenshot of a web browser showing a Condatis report for a flow analysis job.

**Input Data and parameters**

Habitat layer	CalcEng1km.tif
Source and Target layer	Eng_SN.tif
Reproductive Rate (individuals per km <sup>2</sup> )	2000.0
Dispersal Distance (km)	8.0

**Results**

**Output files:**  
All files included in zip file [CalcEng8kmFlow2\\_results.zip](#) (Click to download)

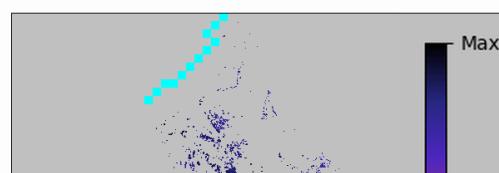
- i. CalcEng8kmFlow2.csv
- ii. CalcEng8kmFlow2\_flow.tif
- iii. CalcEng8kmFlow2\_progress.tif

**Warning: Voltages detected both above bounds and have been clipped  
We suggest increasing the dispersal value**

The *Help Documentation* on the Condatis website provides further information to assist with the interpretation of Condatis outputs and with troubleshooting, and can be accessed [here](#).  
Maps shown in .tif files can be viewed using a mapping platform, for example [QGIS](#)(free and open source) or [ArcGIS](#).

**Summary of results.**  
The overall speed of movement of the modelled species from source to target in this landscape is 0.00. The lower the speed, the longer the time it would take for the first colonisation of the target. The relationship between Condatis' speed and the rate of movement in population simulations is very significant, but not exact or linear (Hodgson *et al.*, 2012). If speed is <<1 it probably indicates that many generations would be needed for the species to reach the target. If the speed is >>1 it may indicate that there are many alternative routes which all have a possibility of leading to the first successful target colonisation.

**Flow Map**



# Interpreting results

## - Flow

The overall speed of movement of the modelled species from source to target in this landscape is 6.056567e-06. The lower the speed, the longer the time it would take for the first colonisation of the target. The relationship between Condatis speed and the rate of movement in population simulations is very significant, but not exact or linear (Hodgson et al., 2012). If speed is <<1 it probably indicates that many generations would be needed for the species to reach the target. If the speed is >>1 it may indicate that there are many alternative routes which all have a possibility of leading to the first successful target colonisation.

Dispersal distance = 5km

SPEED OF MOVEMENT

*Which routes are the modelled population using to move through this landscape?*

*How quickly is the species of interest moving between the southern source and northern target?*

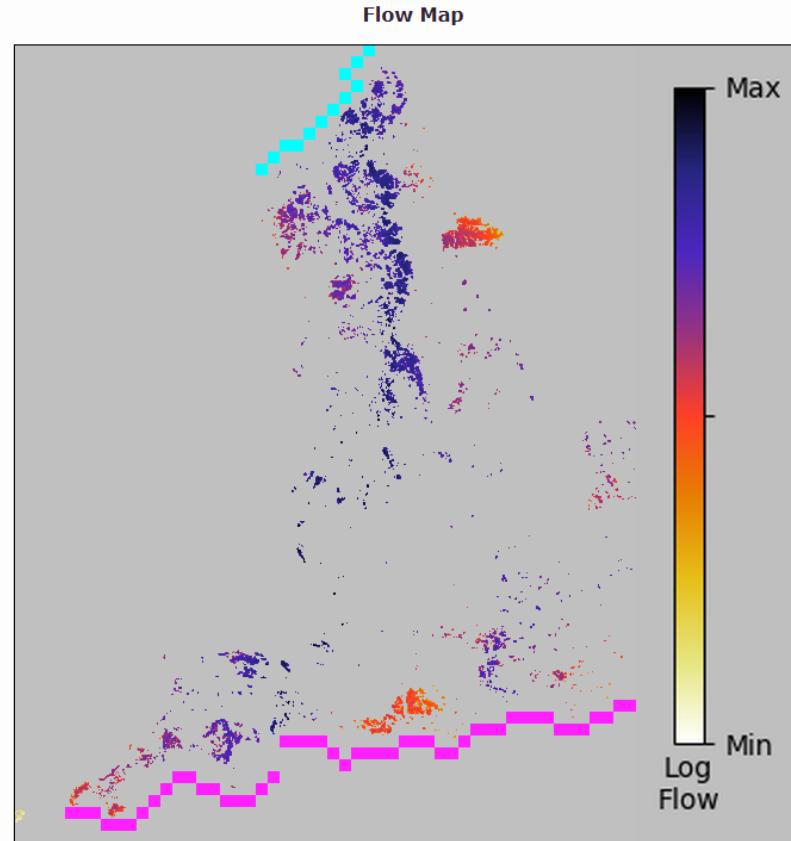


Fig. 1: The pattern of flow of individuals from source to target across the landscape. Flow through each cell is represented by the colour ramp, (note log scale). The source and target are labelled using MAGENTA and CYAN respectively. Cells that do not contain habitat are grey.

# Interpreting results

## - Flow

The overall speed of movement of the modelled species from source to target in this landscape is 0.0027. The lower the speed, the longer the time it would take for the first colonisation of the target. The relationship between Conditis' speed and the rate of movement in population simulations is very significant, but not exact or linear (Hodgson et al., 2012). If speed is <<1 it probably indicates that many generations would be needed for the species to reach the target. If the speed is >>1 it may indicate that there are many alternative routes which all have a possibility of leading to the first successful target colonisation.

**Dispersal distance = 10km**

**SPEED OF MOVEMENT  
&  
FLOW**

*Which routes are the modelled population using to move through this landscape?*

*How quickly is the species of interest moving between the southern source and northern target?*

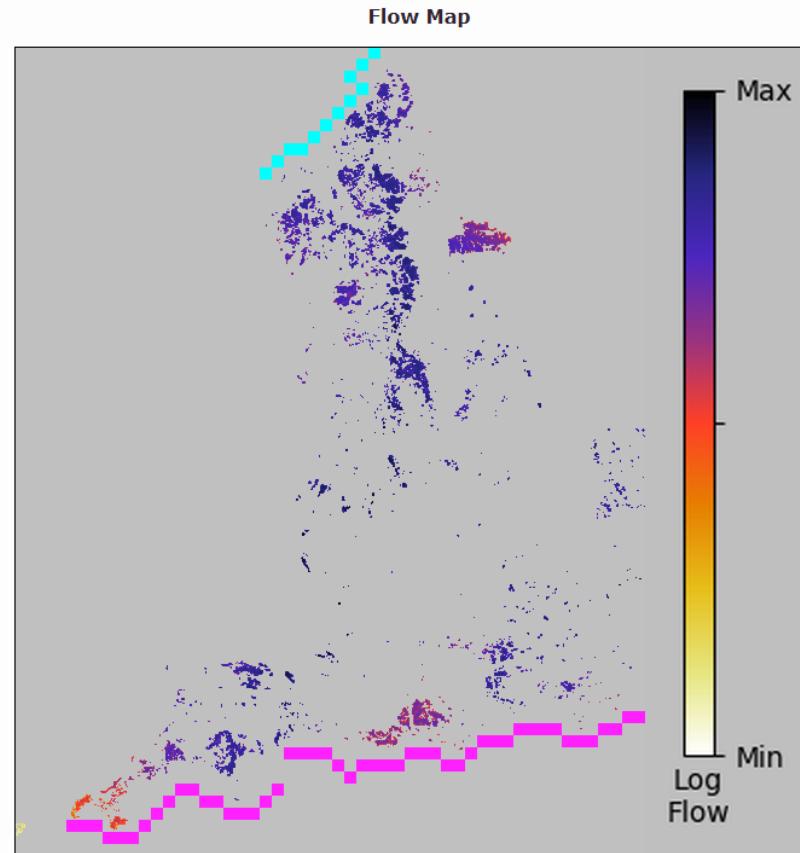
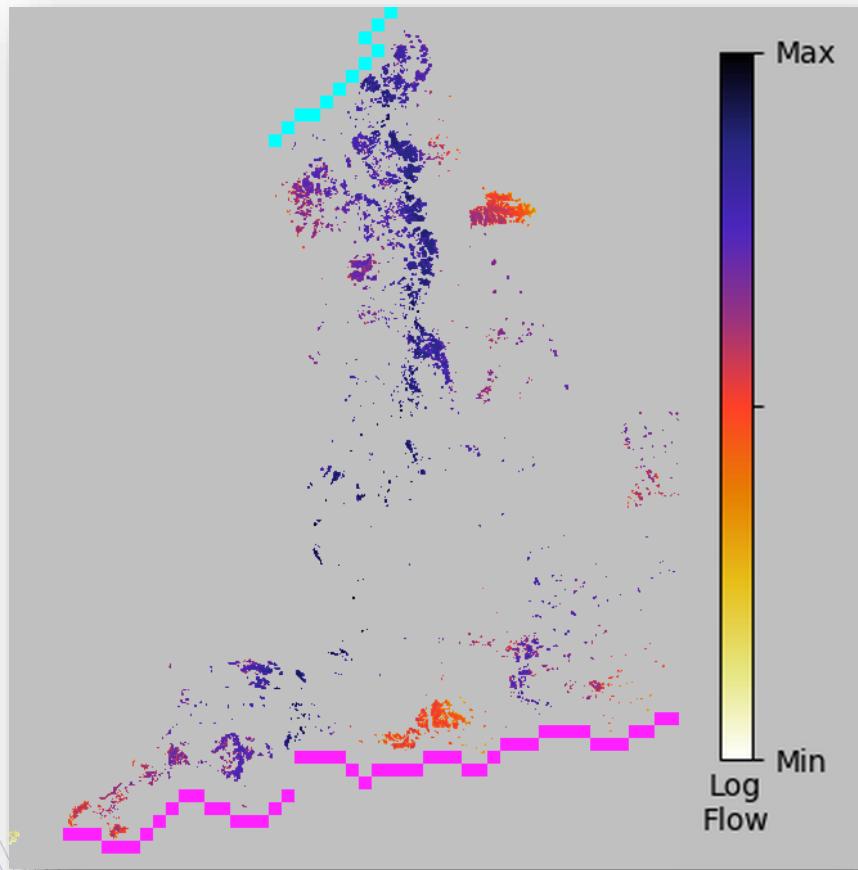
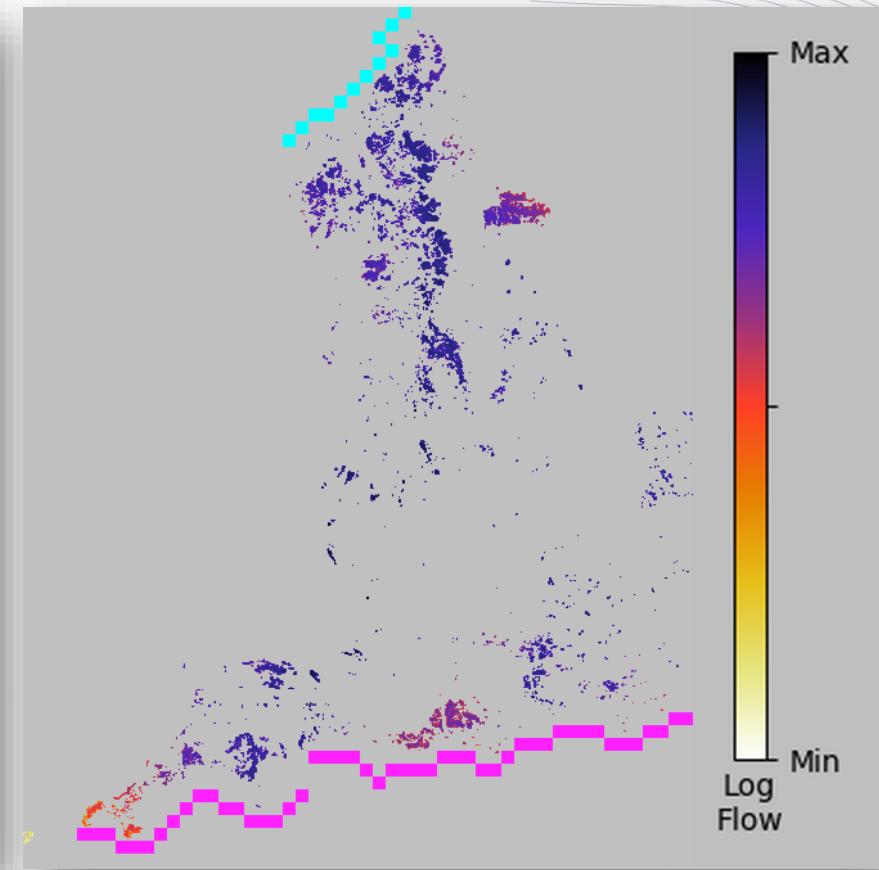


Fig. 1: The pattern of flow of individuals from source to target across the landscape. Flow through each cell is represented by the colour ramp, (note log scale). The source and target are labelled using MAGENTA and CYAN respectively. Cells that do not contain habitat are grey.

# Interpreting results – Flow



Dispersal distance = 5km



Dispersal distance = 10km

## FLOW

*Are there differences in the flow of populations across this landscape? Why?*

# Interpreting results – Flow

Dispersal distance = 5km

PROGRESS OF MOVEMENT

*Are there bottlenecks in the landscape or is speed of movement relatively uniform across it?*

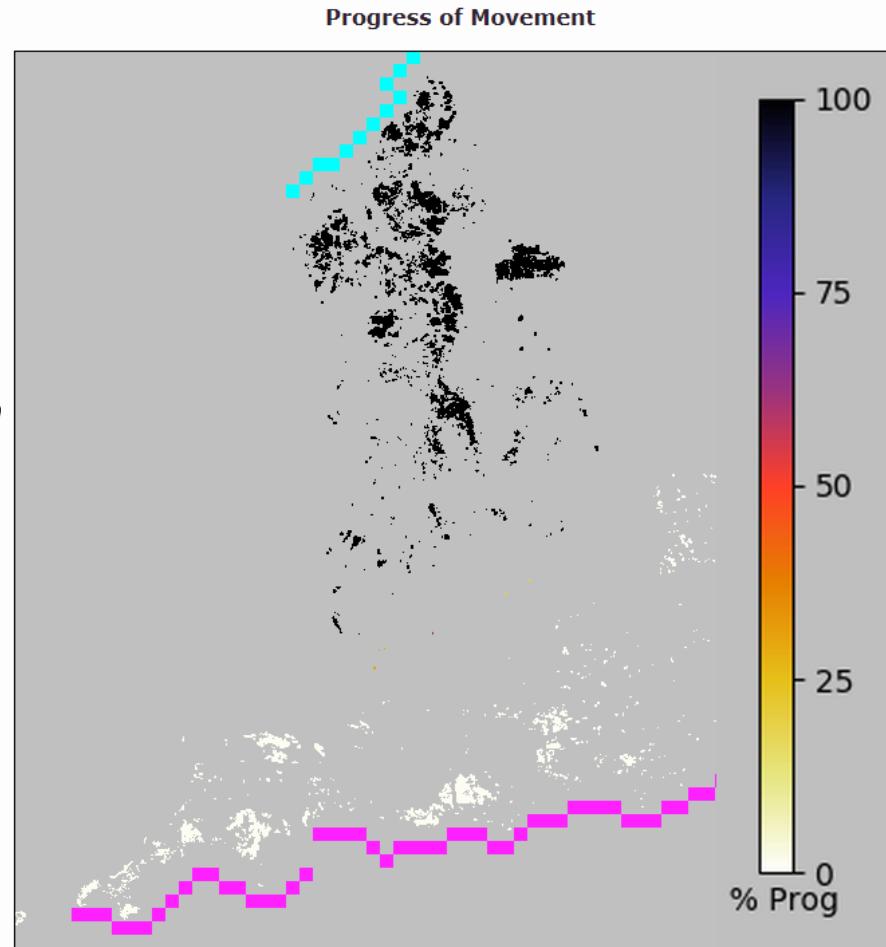


Fig. 2: The progress of movement from source to target is illustrated by the colour ramp. Bands of similar colour lie at a similar effective distance between the source and the target, e.g. a value of 50%, as demonstrated in the legend, represents the cells the species is expected to reach within half of the total 'travel' time. The source and target are labelled using MAGENTA and CYAN respectively.

# Interpreting results – Flow

Dispersal distance = 10km

PROGRESS OF MOVEMENT

*Are there bottlenecks in the landscape or is speed of movement relatively uniform across it?*

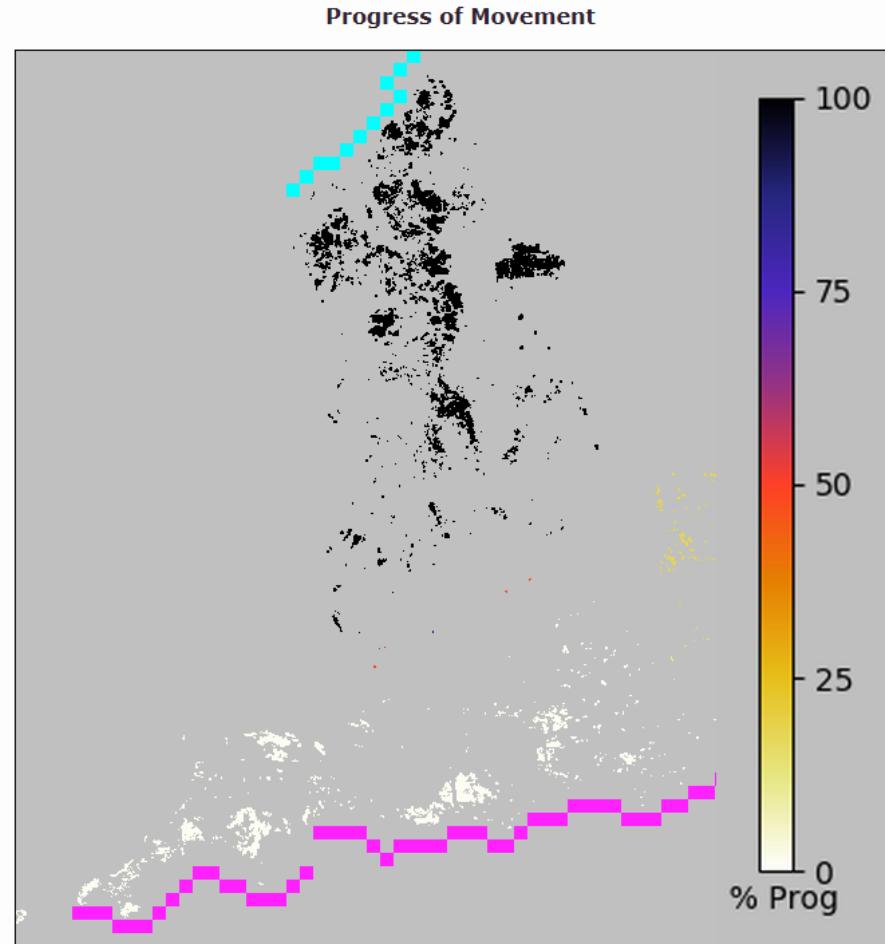
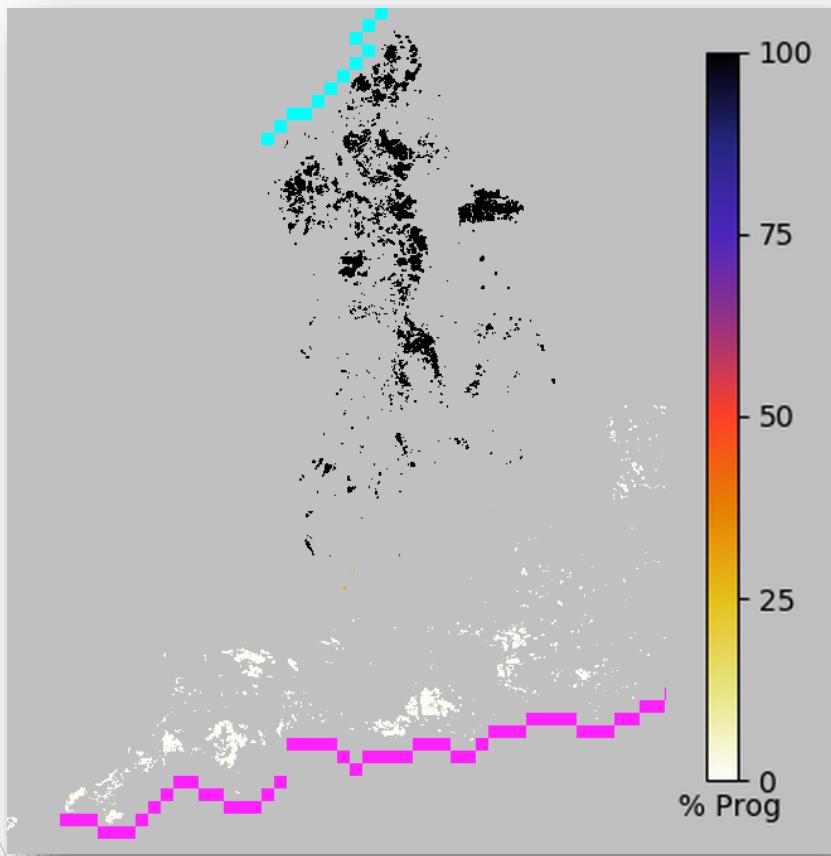
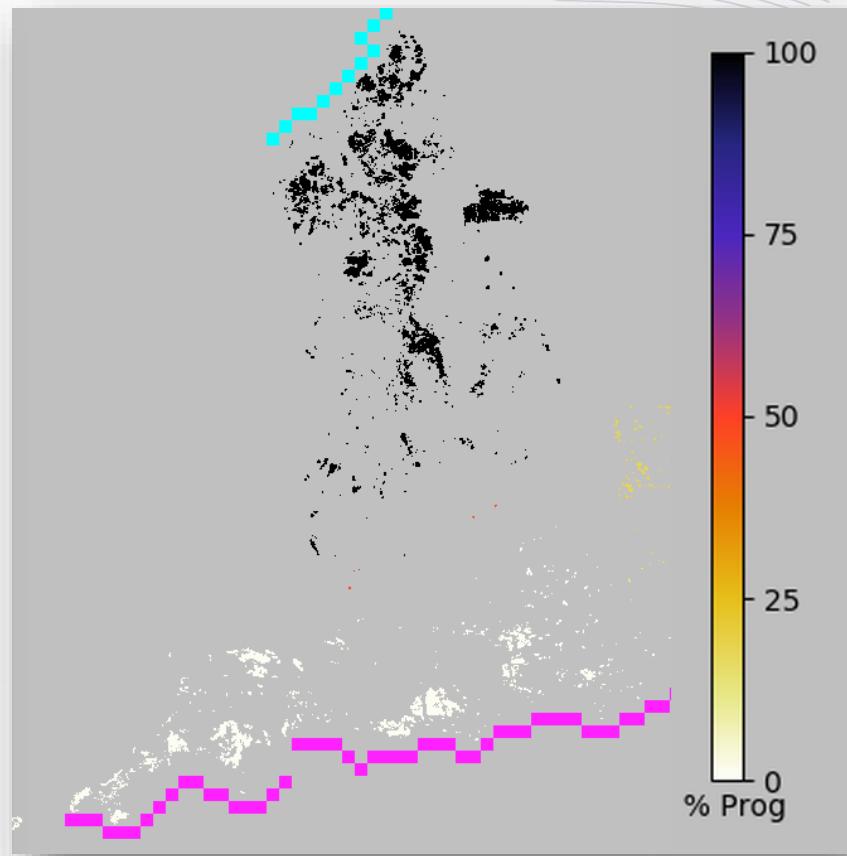


Fig. 2: The progress of movement from source to target is illustrated by the colour ramp. Bands of similar colour lie at a similar effective distance between the source and the target, e.g. a value of 50%, as demonstrated in the legend, represents the cells the species is expected to reach within half of the total 'travel' time. The source and target are labelled using MAGENTA and CYAN respectively.

# Interpreting results – Flow



Dispersal distance = 5km



Dispersal distance = 10km

## PROGRESS OF MOVEMENT

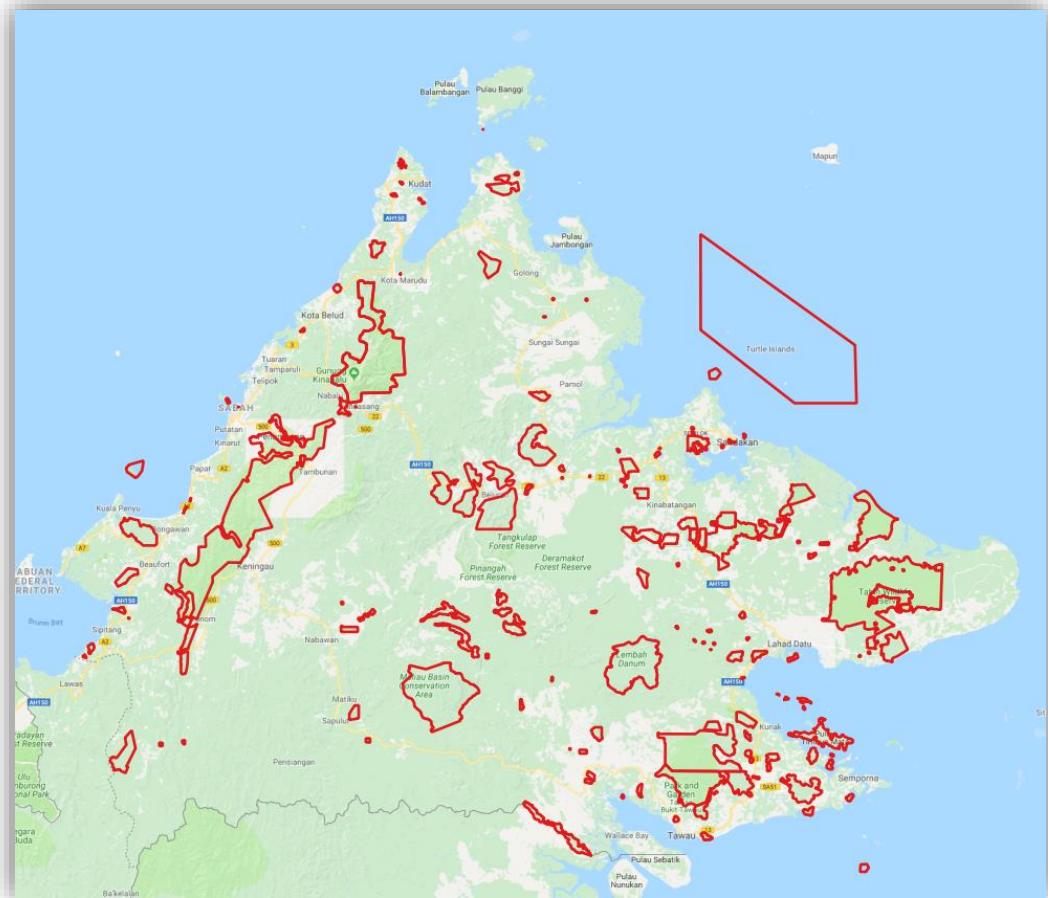
*Are there differences in the progress of movement between the different dispersal distances? Why?*

# DROPPING - Enhancing Sabah's PA Network

Conservation & Management Qs:

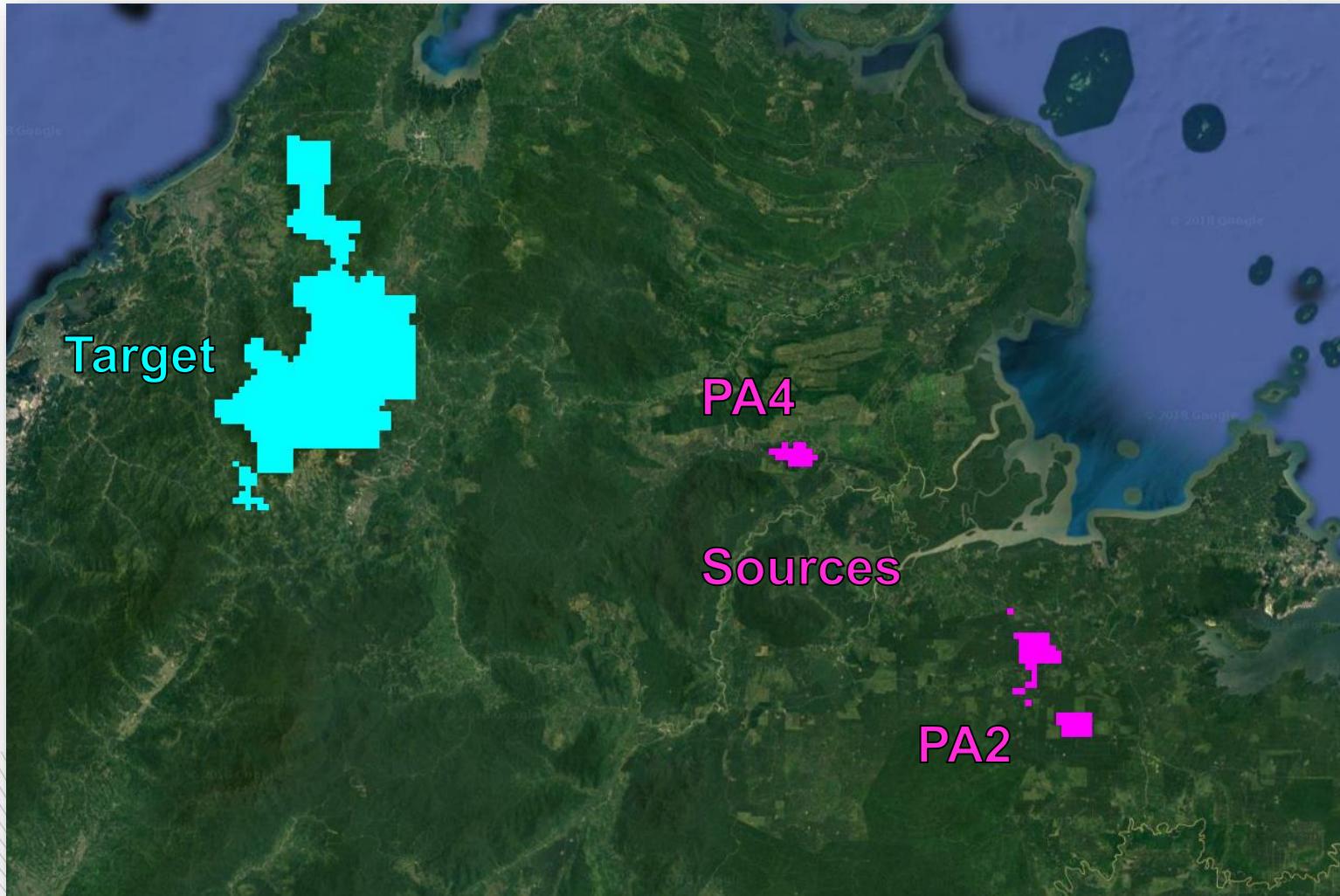
*As the climate gets hotter, **which forested routes** will populations take to move from lowland Protected Areas to suitable habitats on Mount Kinabalu?*

*Given a desire and resources to protect more of Sabah's forest, which are the currently unprotected forest habitats that are a **priority to protect** to ensure long-term connectivity between lowland PAs and Mount Kinabalu?*



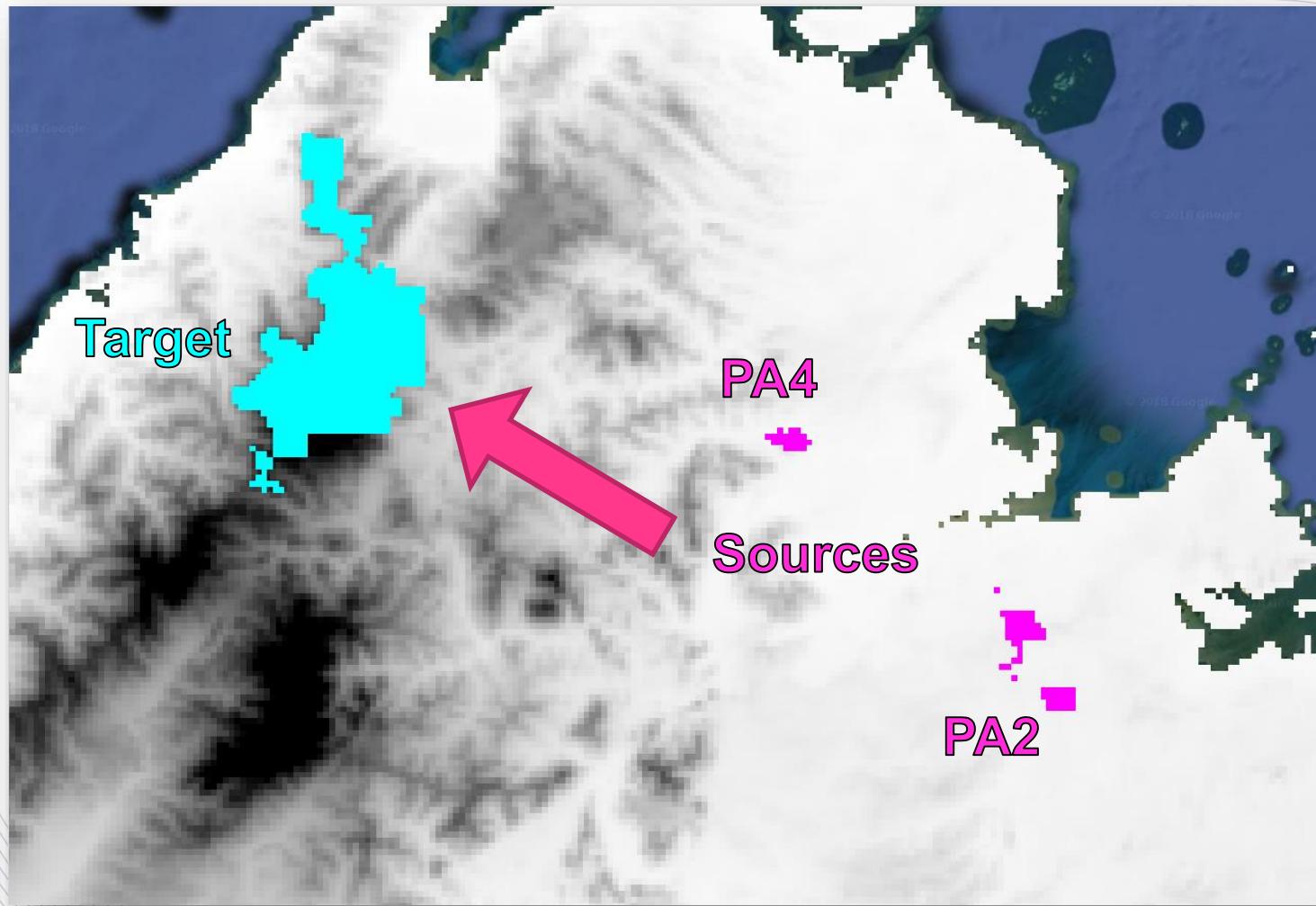
Sabah's Protected Areas

# Case study Protected Areas



Lowland sources to highland target

# ....Direction of movement



*Annual mean temperature*  
Species' ranges will shift towards cooler areas

# ....Habitat



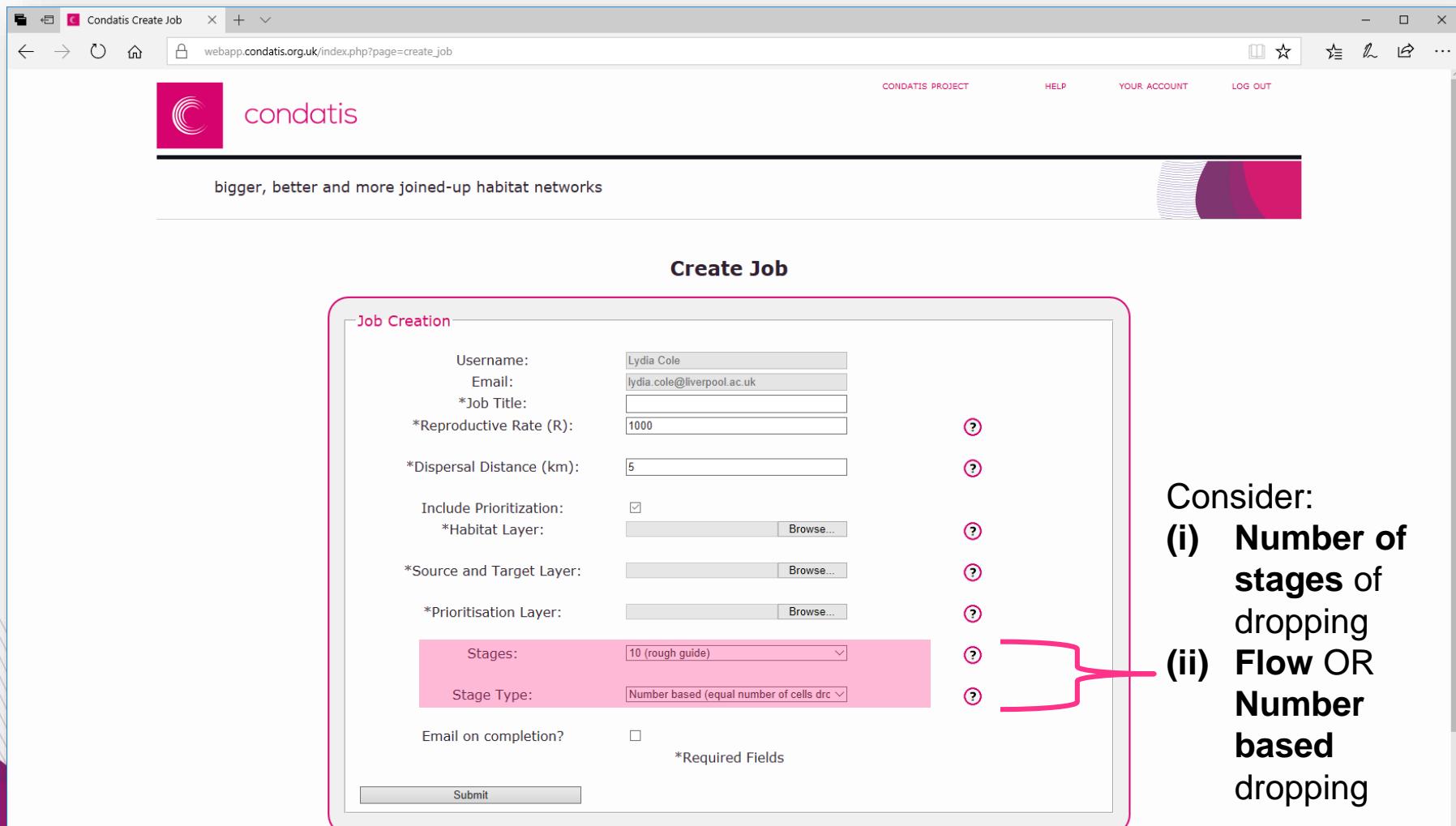
*Forest cover (Gaveau et al., 2016)*  
Species will move through forest habitat

# Inputs for Condatis – DROPPING analysis

Data/files	Name
File package	CaseStudies → Input_data → Dropping-Sabah
Source/target layer	SourceTargetX.tif e.g. SourceTarget2.tif
Habitat layer	Forestundrop.tif
Prioritisation layer	Forestdrop.tif
Reproductive rate	2000 individuals per km <sup>2</sup>
Dispersal distance	4km
Stages	10 (rough guide)
Stage Type	Number based
Condatis “job” name	SabahPAXDrop

# Dropping analysis

## 1. Decide on type of dropping



The screenshot shows the 'Condatis Create Job' interface on a web browser. The page title is 'Condatis Create Job'. The main heading is 'Create Job'. A sub-section titled 'Job Creation' contains several input fields:

- Username: Lydia Cole
- Email: lydia.cole@liverpool.ac.uk
- \*Job Title: (empty)
- \*Reproductive Rate (R): 1000
- \*Dispersal Distance (km): 5
- Include Prioritization:
- \*Habitat Layer: (Browse...)
- \*Source and Target Layer: (Browse...)
- \*Prioritisation Layer: (Browse...)
- Stages: 10 (rough guide) (dropdown menu)
- Stage Type: Number based (equal number of cells drc) (dropdown menu)
- Email on completion?

Required fields are marked with an asterisk (\*). A pink box highlights the 'Stages' and 'Stage Type' fields. A pink bracket on the right side of the form points to a list of considerations.

Consider:

- (i) **Number of stages of dropping**
- (ii) **Flow OR Number based dropping**

# Dropping analysis

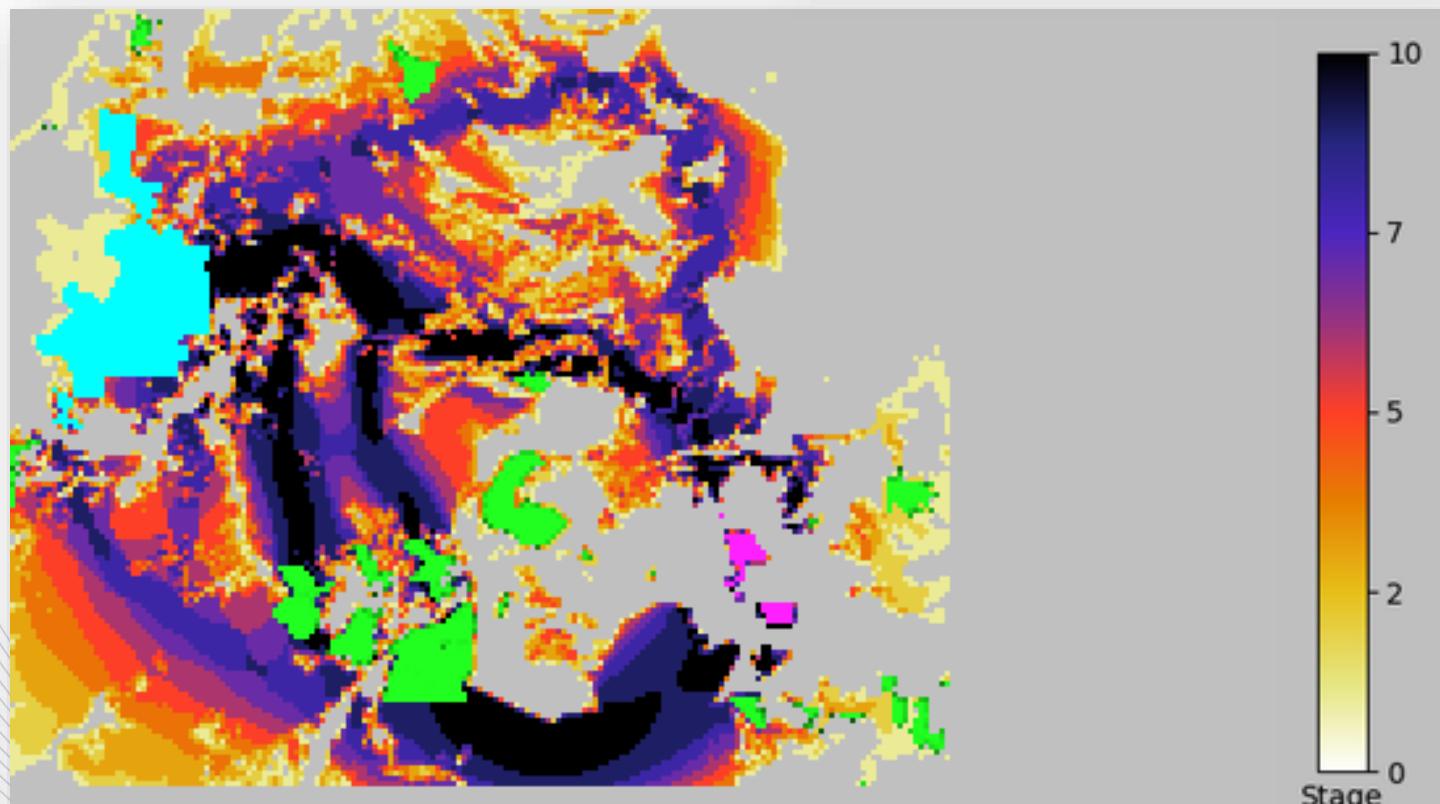
*Over how many stages do you want to drop your habitat cells?*

e.g. 10 stages

Stages:

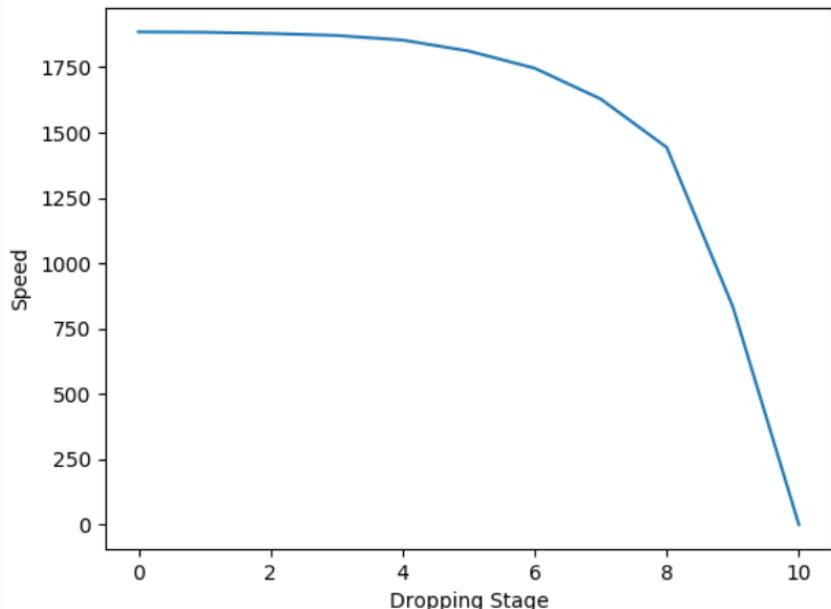
- 10 (rough guide)
- 1000
- 100 (recommended)
- 50
- 10 (rough guide)**

Stage Type:



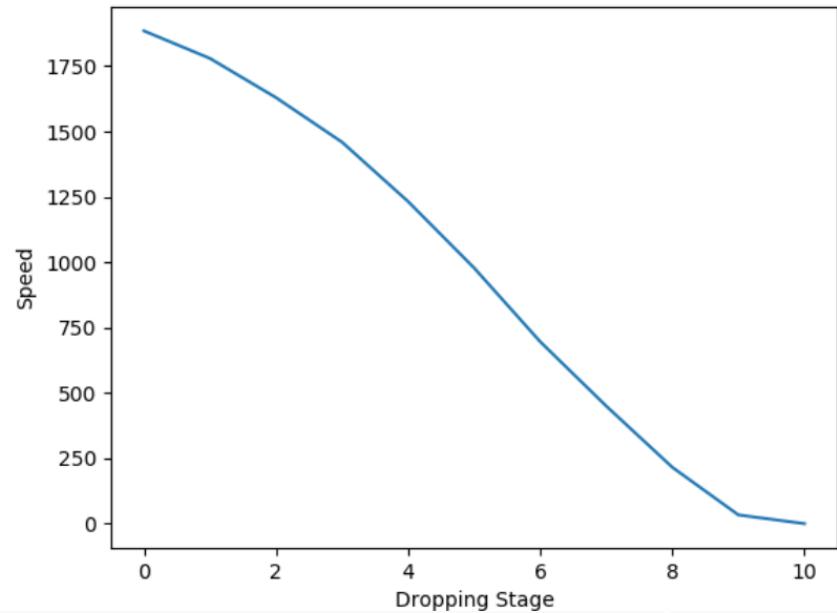
# Dropping analysis

Number based



- An equal **number of cells** is lost at each dropping stage
- i.e. for 10 stages of dropping:  
 $Cells\ lost\ per\ stage = Total\ cells/10$

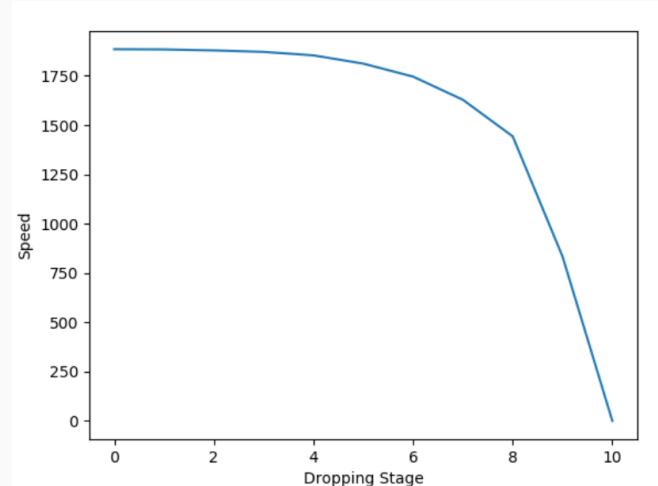
Flow based



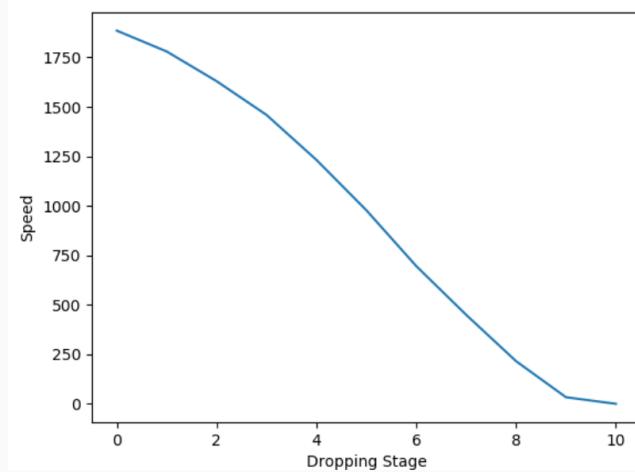
- An equal **amount of flow** is lost at each dropping stage
- i.e. for 10 stages of dropping:  
 $Flow\ lost\ per\ stage = Total\ flow/10$

# Dropping analysis

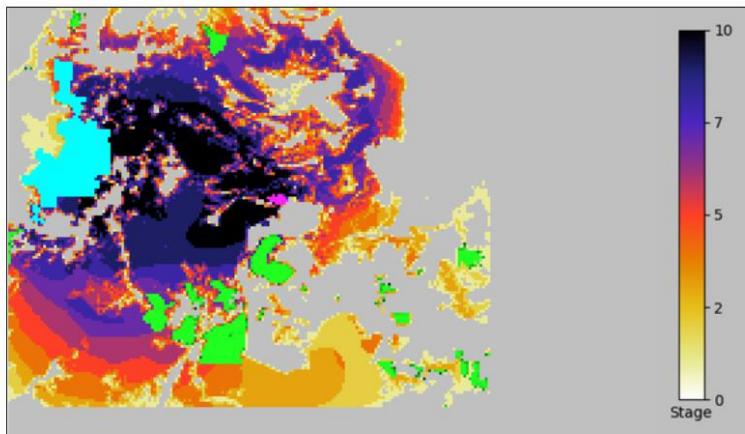
Number based



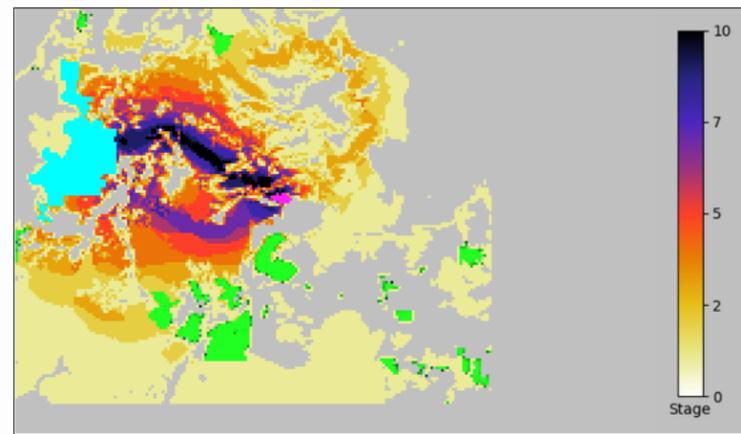
Flow based



Dropping Rank Map



Dropping Rank Map



# Dropping analysis

## 2. Fill out data input boxes & run analysis

Condatis Create Job    +    [webapp.condatis.org.uk/index.php?page=create\\_job](http://webapp.condatis.org.uk/index.php?page=create_job)

CONDATIS PROJECT    HELP    YOUR ACCOUNT    LOG OUT

bigger, better and more joined-up habitat networks

### Create Job

**Job Creation**

Username:	Lydia Cole	?
Email:	lydia.cole@liverpool.ac.uk	?
*Job Title:	<input type="text"/>	?
*Reproductive Rate (R):	1000	?
*Dispersal Distance (km):	5	?
Include Prioritization:	<input checked="" type="checkbox"/>	?
*Habitat Layer:	<input type="button" value="Browse..."/>	?
*Source and Target Layer:	<input type="button" value="Browse..."/>	?
*Prioritisation Layer:	<input type="button" value="Browse..."/>	?
Stages:	10 (rough guide)	?
Stage Type:	Number based (equal number of cells drc)	?
Email on completion?	<input type="checkbox"/>	?

\*Required Fields

# Dropping analysis

## 3. Open Results html page & download zip files

Condatis analysis results report.  
Job: SabahPA2Drop  
Analysis Type: Dropping

Name	Lydia Cole
Email	lydia.cole@liverpool.ac.uk
Date presented	09/21/2018 16:09:38
Time taken for analysis	0:01:42

**Input Data and parameters**

Habitat layer	Forestundrop.tif
Source and Target layer	SourceTarget2.tif
Prioritisation Layer	Forestdrop.tif
Reproductive Rate (individuals per km <sup>2</sup> )	2000.0
Dispersal Distance (km)	4.0

**Processes**

Condatis Version	1.00
Dropping Steps	10
Step type	Number based

**Results**

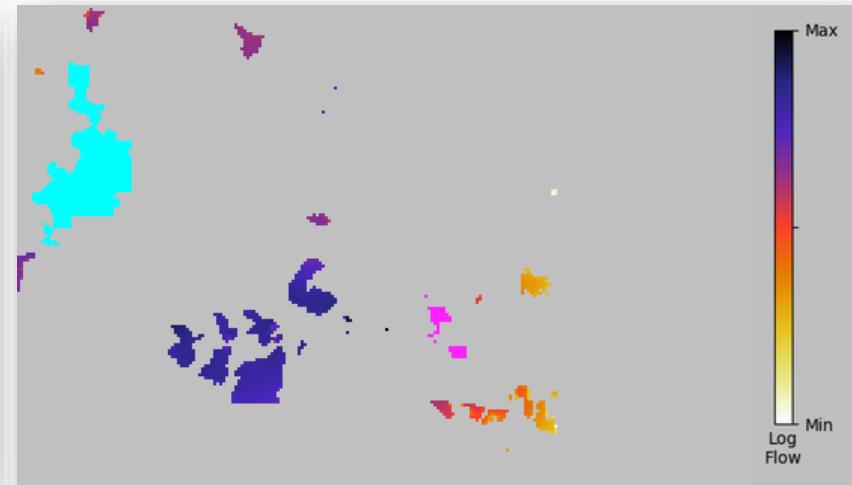
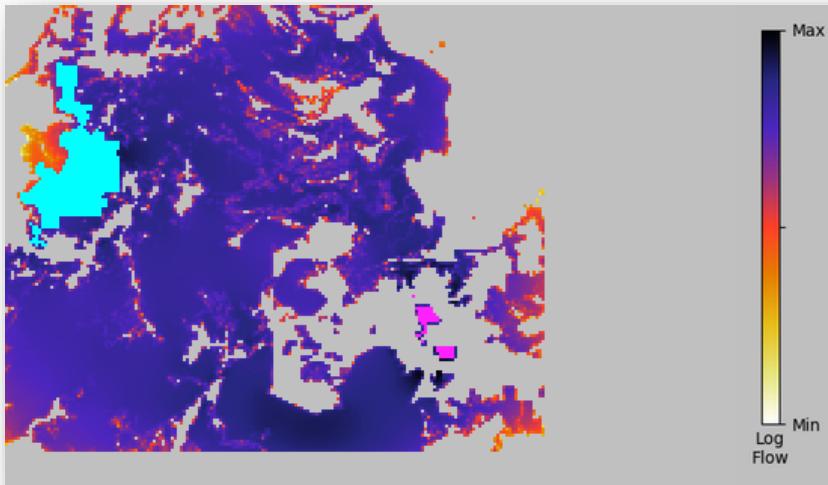
**Output files:**  
All files included in zip file [SabahPA2Drop\\_results.zip](#) (Click to download)

**KEY RESULTS**  
[SabahPA2Drop.csv](#)  
[SabahPA2Drop\\_dropping\\_rank.tif](#)

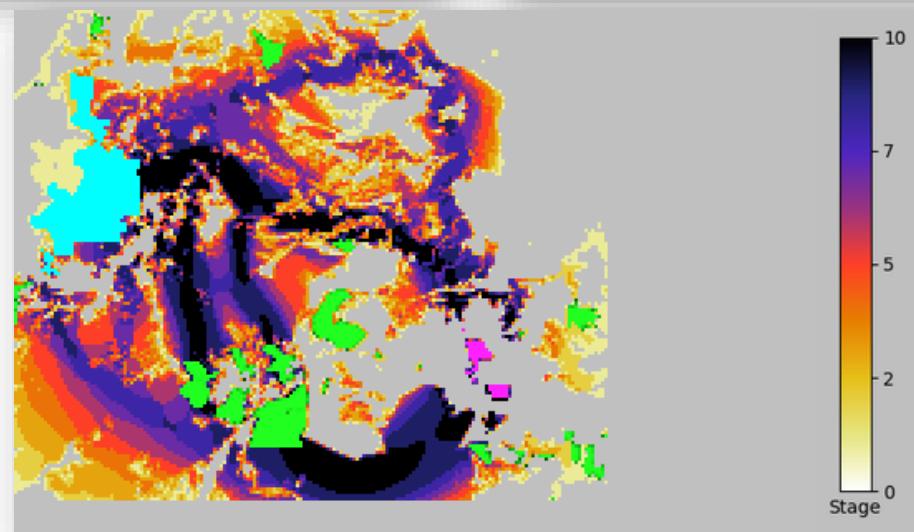
# Dropping analysis

4. Check “job” has worked by viewing html report

PA2



Start flow

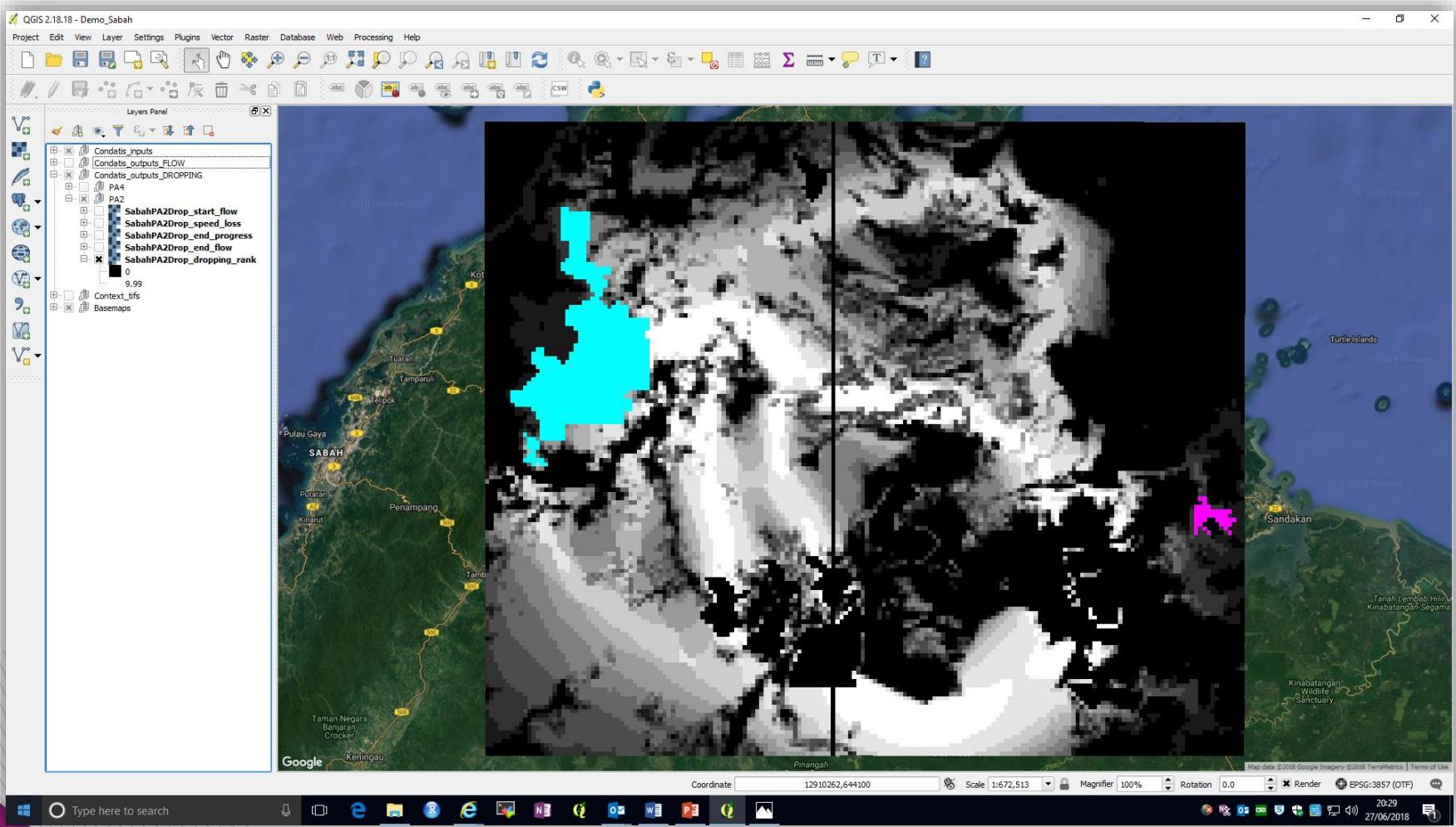


End flow

Dropping rank

# Dropping analysis

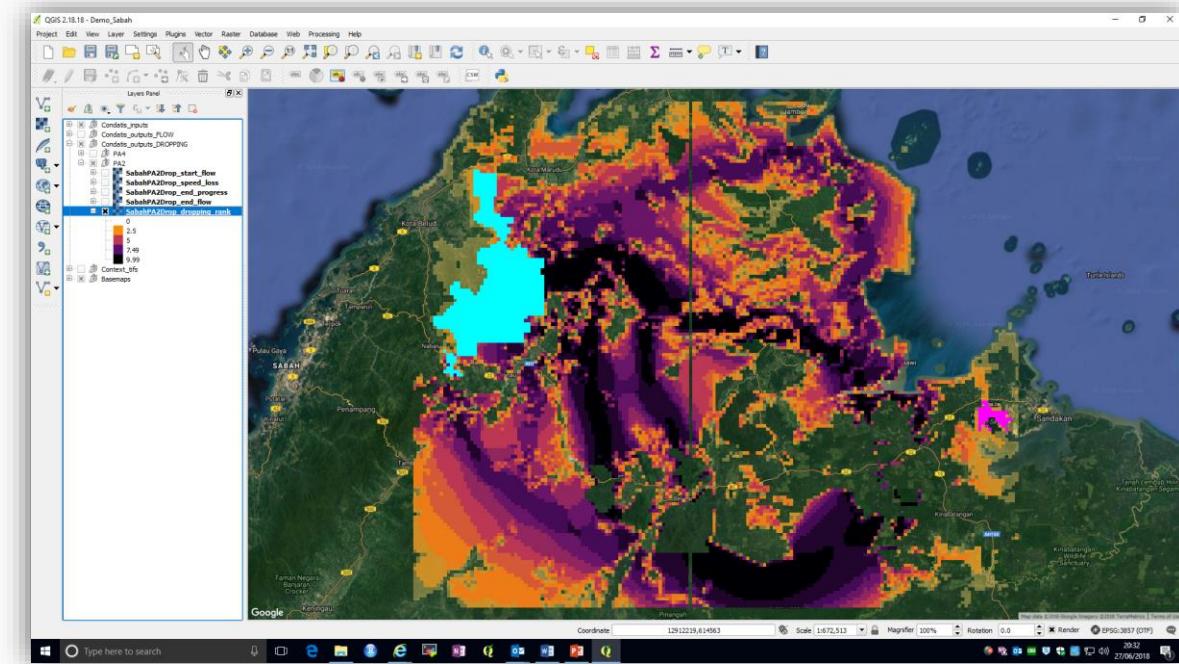
## 5. Display & interrogate results in QGIS



# SABAH PROTECTED AREAS – Dropping analysis

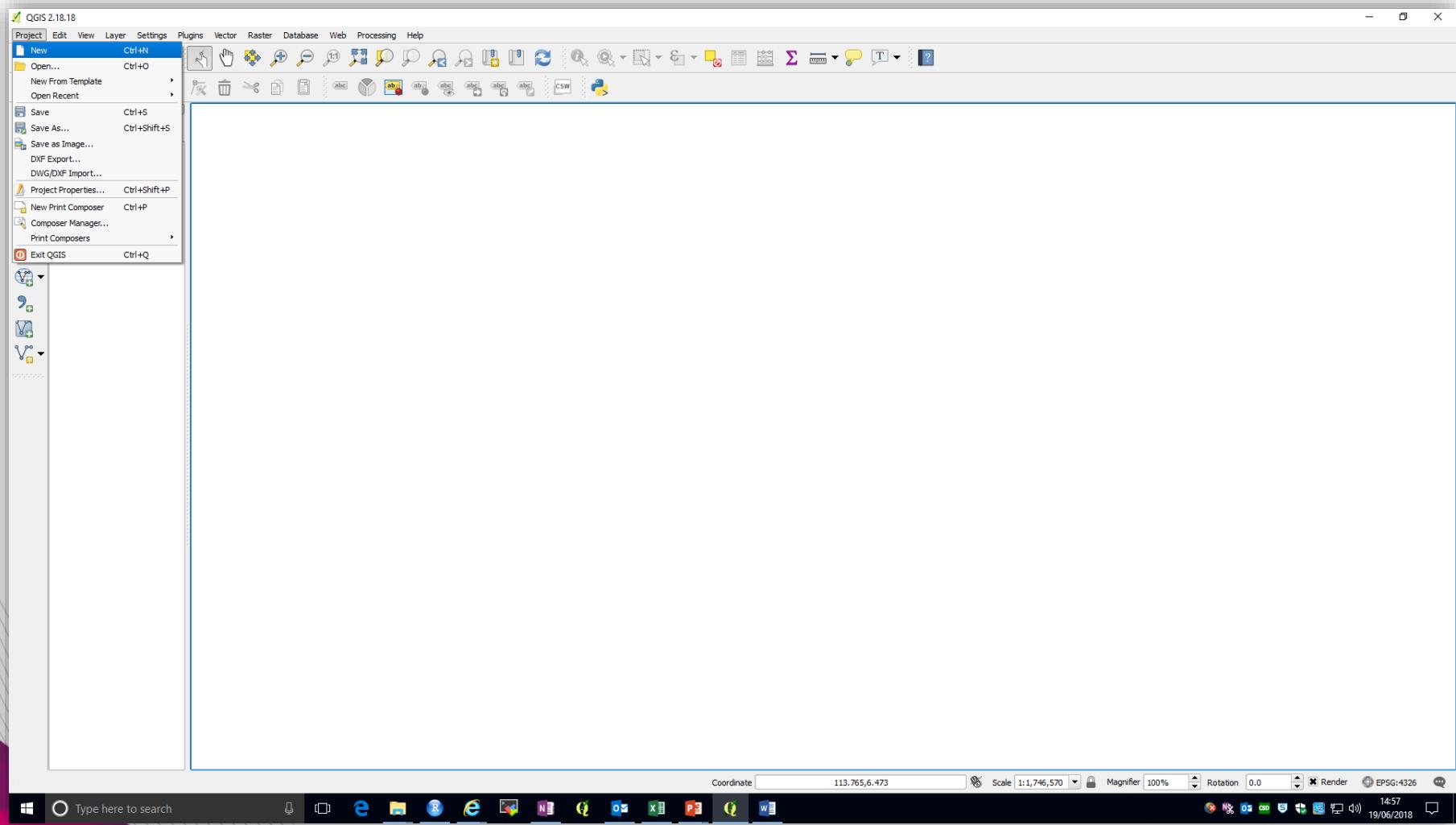
*Given a desire and resources to protect more of Sabah's forest, which are the currently unprotected forest habitats that are a priority to protect to ensure long-term connectivity between lowland PAs and Mount Kinabalu?*

1. Decide on type of dropping
2. Fill out data input boxes & run analysis (PA2)
3. Open Results html page & download zip files
4. Check job has worked
5. Display & interrogate results in QGIS



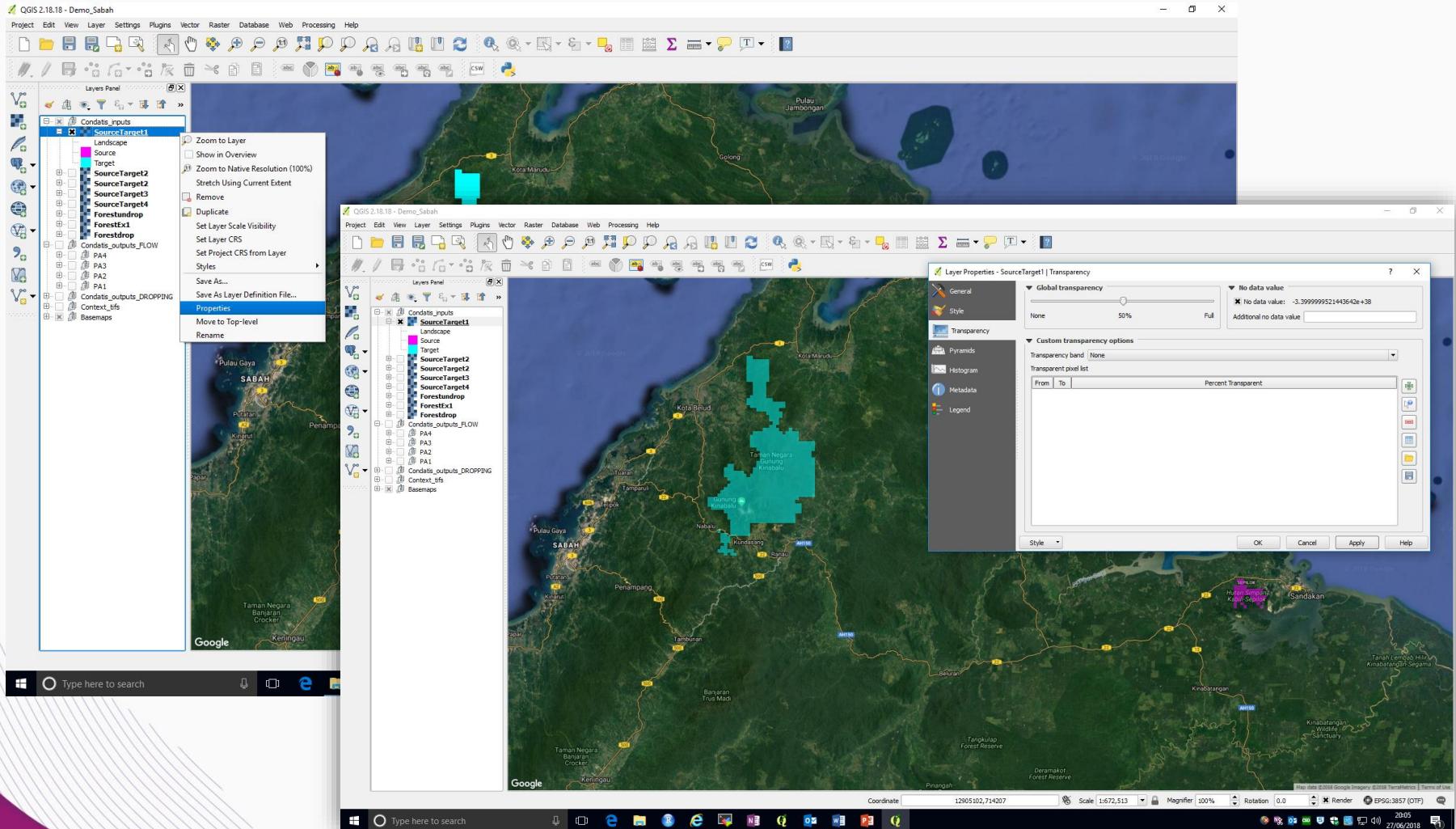
# Visualising results

Create QGIS/ArcMap Project, add contextual layers e.g. habitat and elevation



# Visualising results

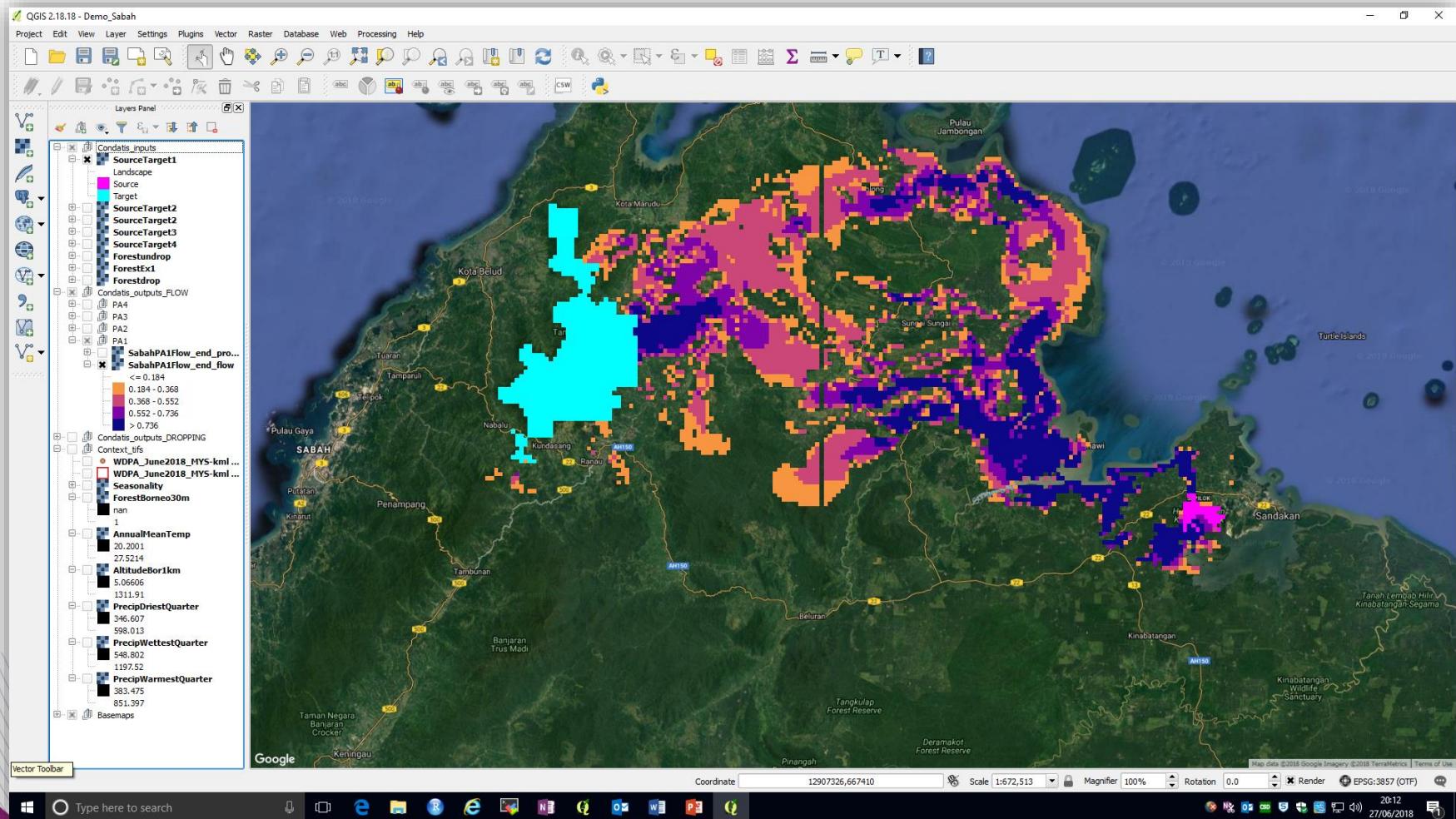
Add Condatis input and output layers; organise map layers



*Folders, order of layering, styling & transparency*

# Visualising results

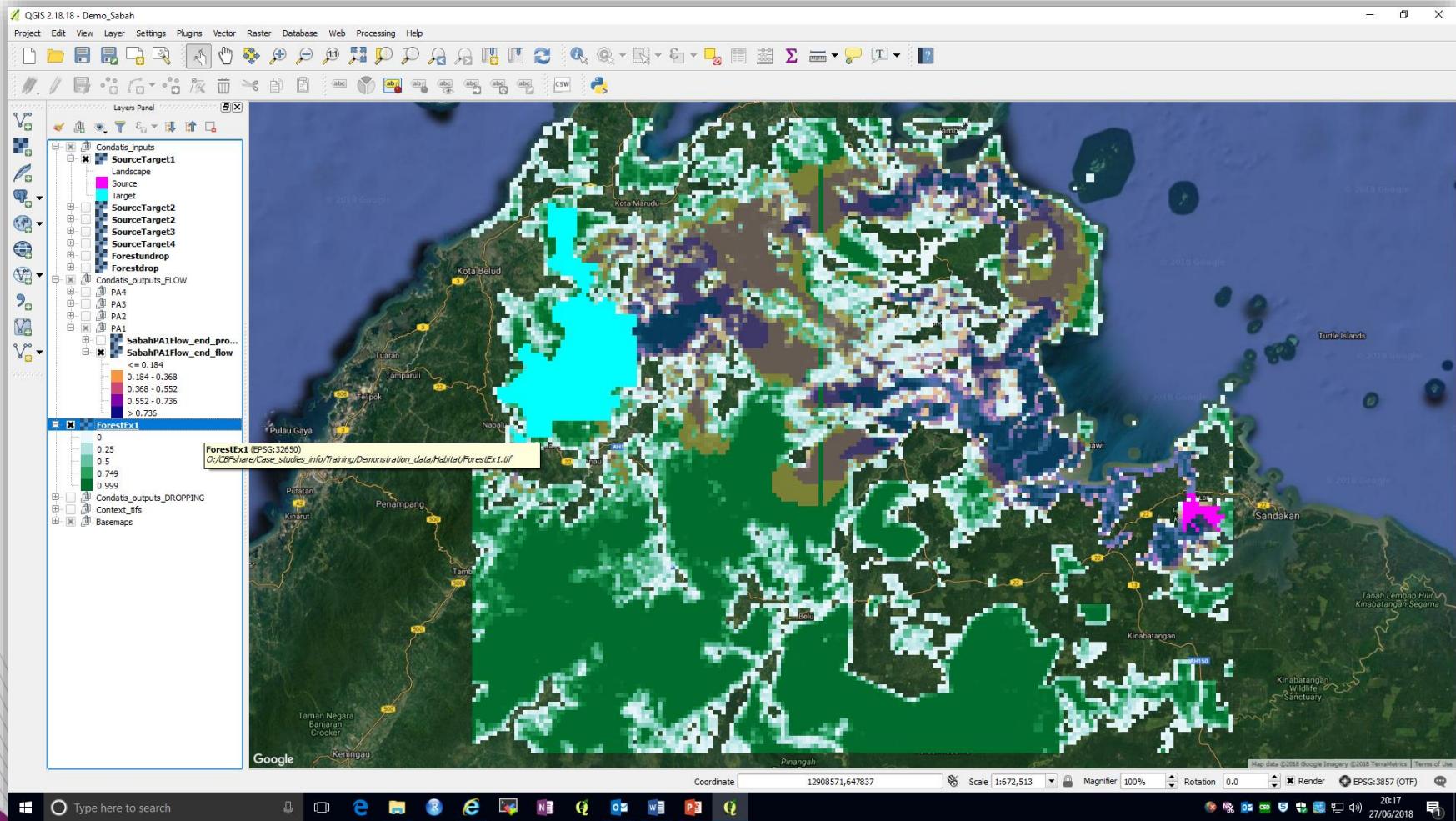
Interrogate the results



*Which forested routes will populations take to move from lowland Protected Areas to suitable habitats on Mount Kinabalu?*

# Visualising results

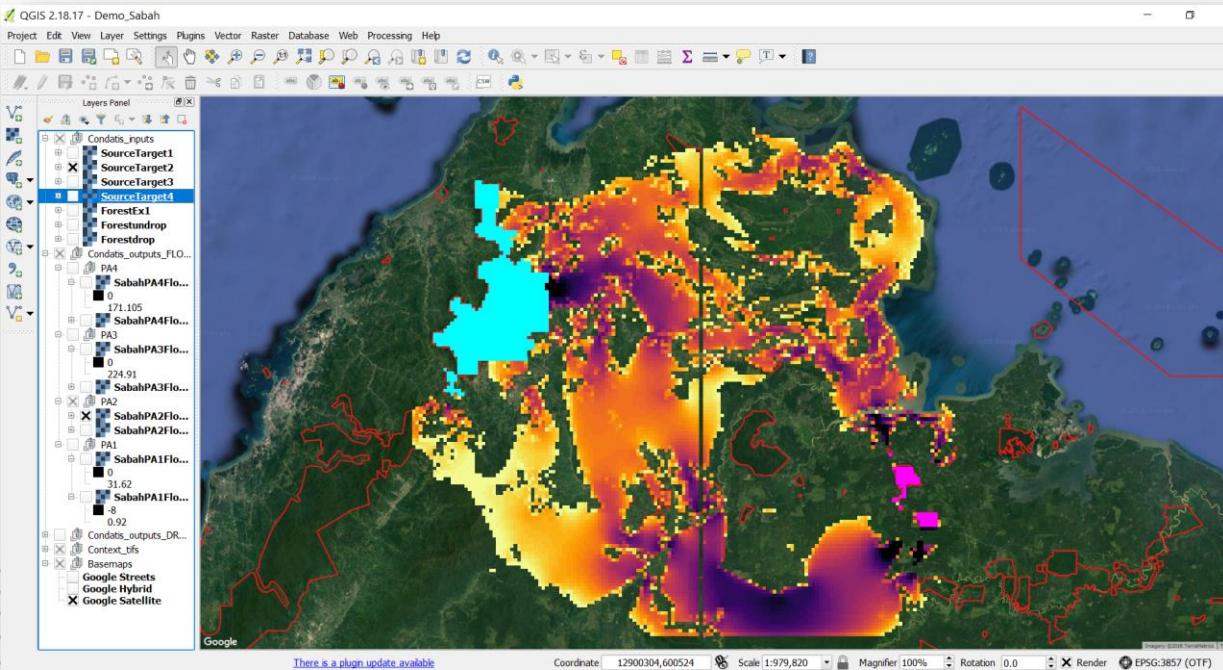
Interrogate them a bit more!



*Which forested routes will populations take to move from lowland Protected Areas to suitable habitats on Mount Kinabalu?*

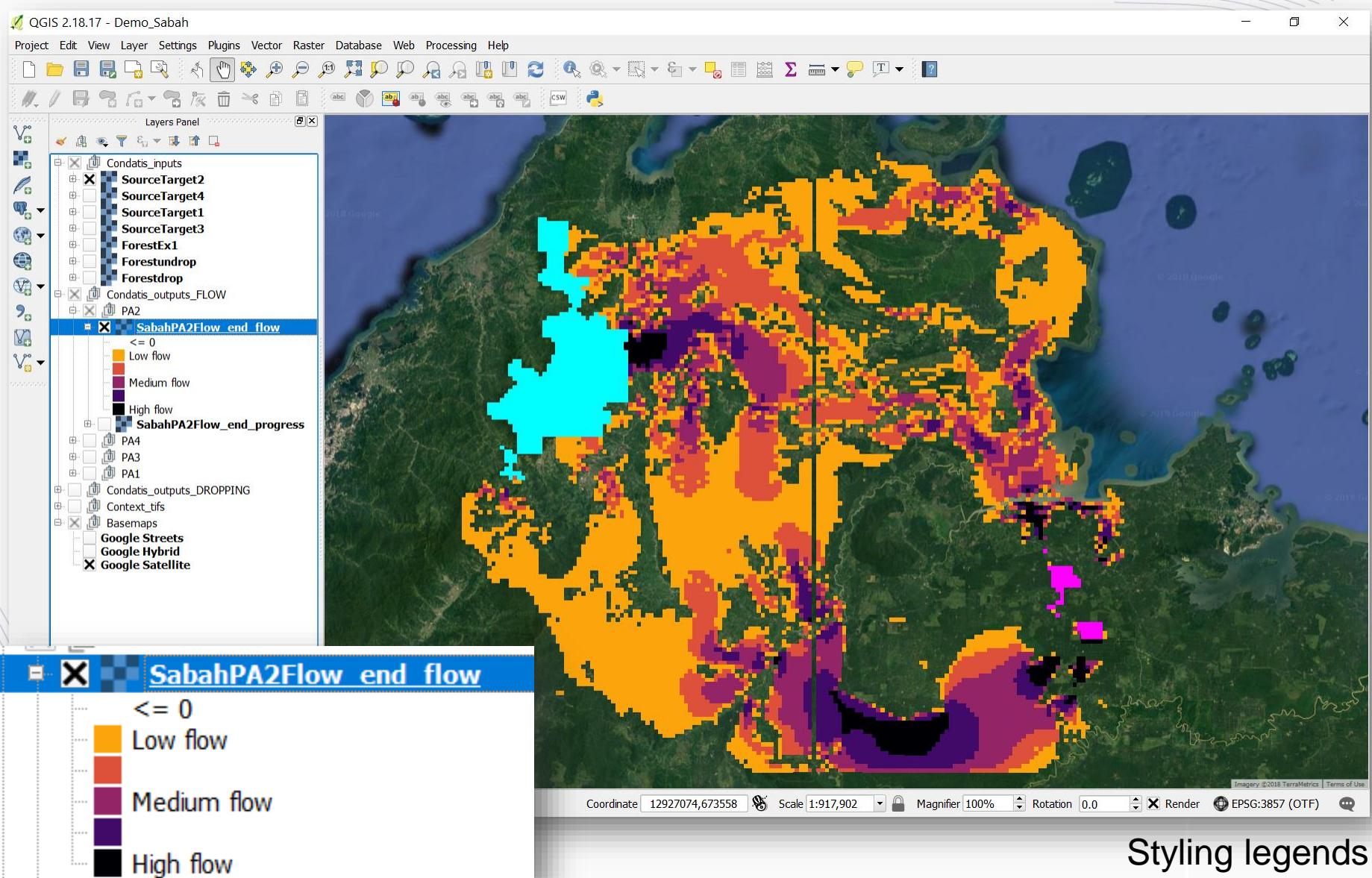
# SABAH PROTECTED AREAS – Visualising results

*As the climate gets hotter, which forested routes will populations take to move from lowland Protected Areas to suitable habitats on Mount Kinabalu?*



- Create QGIS project
- Add base map
- Add layers for context
- Display results in QGIS
- Organise map layers
- Interrogate the results

# Presenting results for target audience



# Interpreting results – *Dropping*

## Summary of results.

For this landscape of interest, the speed of movement of the modelled species changes from 444.7793 before any habitat is dropped to 0.0000 once all 15569 additional habitat cells are lost. This represents a reduction in speed of 100.0000% with a loss of habitat of 15569 km<sup>2</sup> (93.52% of the total habitat area).

*What impact does loss of habitat, i.e. dropping, have on speed of movement?*

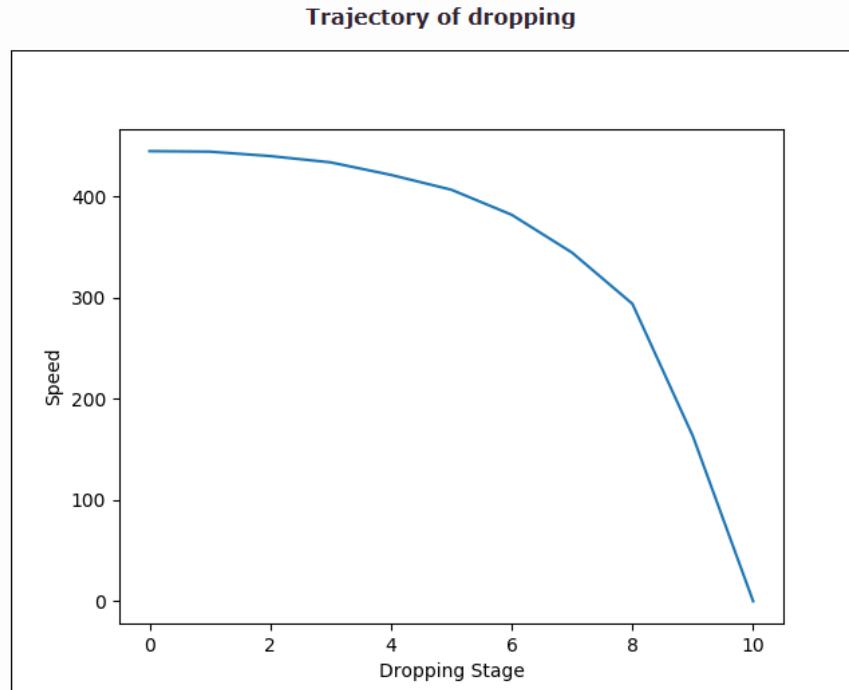


Fig. 1: The speed, (inversely related to the time taken to cross from source to target), is plotted against the stage of dropping. Here the dropping mode is **Number based**. (The dropping of habitat cells from the Prioritisation layer is performed such that an equal amount of cells are dropped per stage). Speed is expected to get slower when habitat is lost from the landscape, but notice how severely speed is lost at different stages.

*How does speed change with each stage of dropping?*

# Interpreting results – *Dropping*

*Which are the most important additional habitat cells to conserve?*

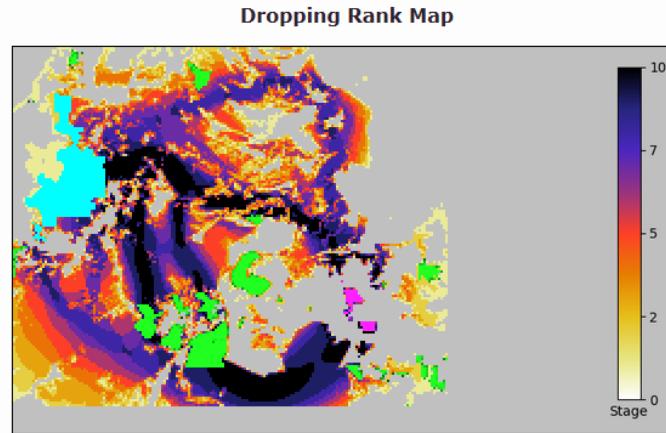


Fig. 2: An illustration of the rank of each habitat cell in the dropping analysis, with each drop stage represented by a different colour on the ramp. The source and target are labelled using MAGENTA and CYAN respectively. Non-droppable habitat cells are coloured GREEN. Lower-ranking cells were dropped earliest because they carried relatively little flow. Higher ranking cells were retained longer, and this implies that they are of higher priority. See table 1 for more information on the cells included in each rank.

Step Dropping Summary

Stage	Dropped	Speed	Speed Reduction	Reduction per Cell
Initial	0	444.779268	0.000000	0.000000
1	1557	444.283717	0.495551	0.000318
2	1557	439.916432	4.367285	0.002805
3	1557	433.701748	6.214684	0.003991
4	1557	421.301069	12.400679	0.007964
5	1557	406.642873	14.658197	0.009414
6	1557	381.891774	24.751098	0.015897
7	1557	344.490884	37.400891	0.024021
8	1557	293.879650	50.611234	0.032506
9	1557	163.357971	130.521679	0.083829
Final	1556	1.162501e-05	1.633580e+02	

Table 1: Summary of results from Condatis dropping analysis, showing the effect of dropping cells at each stage.

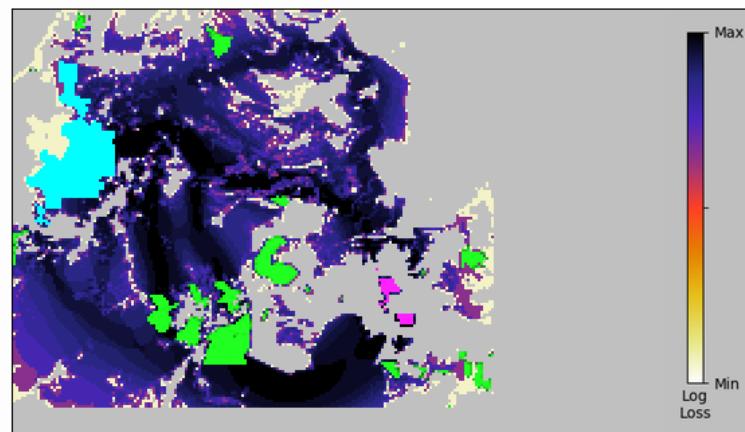
*How does speed of movement change with each stage of dropping?*

# Interpreting results – *Dropping*

## BACKGROUND RESULTS

Additional figures that enable further interrogation of wildlife movement in the landscape.

Loss of Speed



*Which cells, when lost,  
cause the greatest  
reduction in speed?*

Fig. 3: The reduction in the speed of movement of the species from source to target with each stage of dropping is illustrated by the colour ramp, (note log scale). The source and target are labelled using MAGENTA and CYAN respectively. Non-droppable habitat cells are coloured GREEN. This is a spatial representation of the values in column 5 of Table 1, Reduction per cell. Higher values mean that the loss of these cells was highly detrimental to the total speed achievable in the landscape, and it implies these cells are of higher priority for connectivity.

# Interpreting results – *Dropping*

*With all additional habitat,  
where are the main  
migration pathways?*

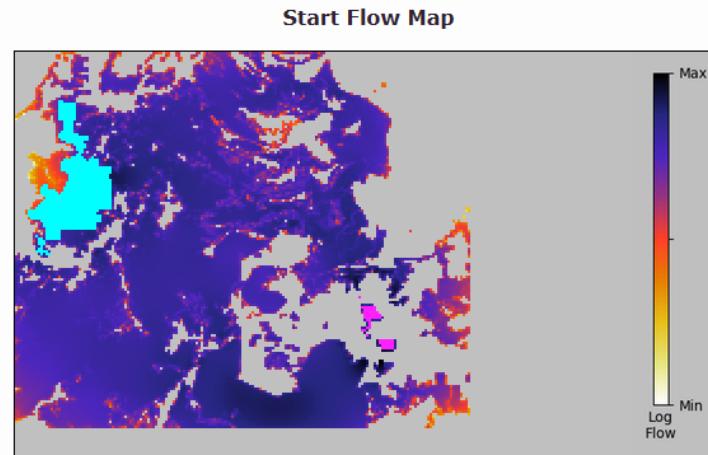


Fig. 4: The pattern of flow of individuals from source to target across the landscape before dropping is performed, i.e. with all habitat cells within the Prioritisation Layer contributing to connectivity. Flow through each cell is represented by the colour ramp, (note log scale). The source and target are labelled using MAGENTA and CYAN respectively. Areas without habitat are grey, i.e. contain no data.

*Without any additional  
habitat, how will species  
migrate between source  
and target?*

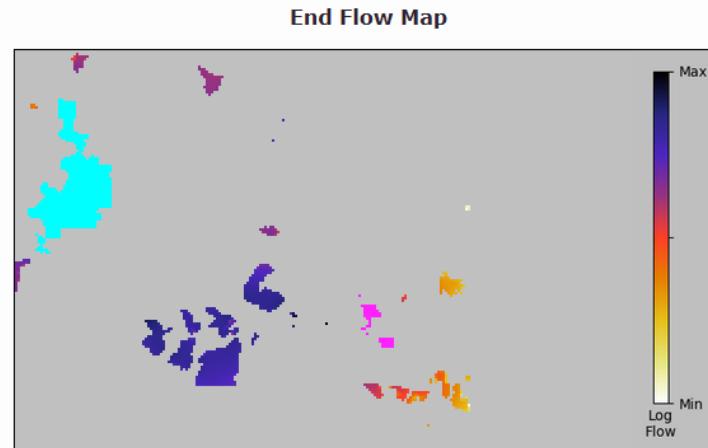


Fig. 5: The pattern of flow of individuals from source to target across the landscape after dropping has been performed, i.e. with no habitat cells within the Prioritisation layer contributing to connectivity. Flow through each cell is represented by the colour ramp, (note log scale). The source and target are labelled using MAGENTA and CYAN respectively. Cells that have been dropped are grey, as are areas that never contained habitat.

# Interpreting results – *Dropping*

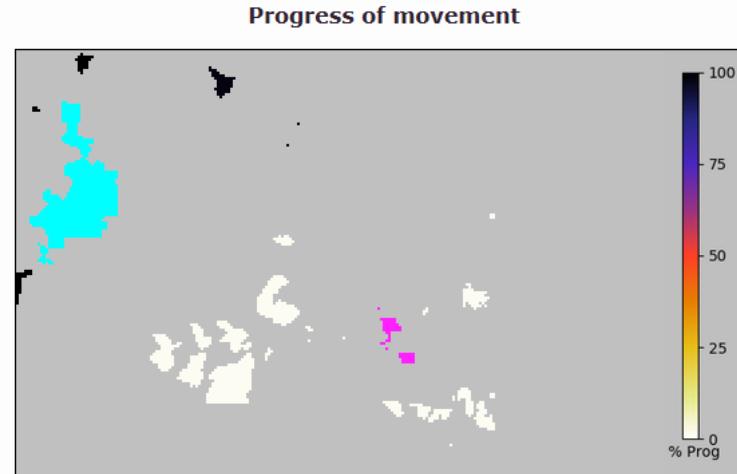
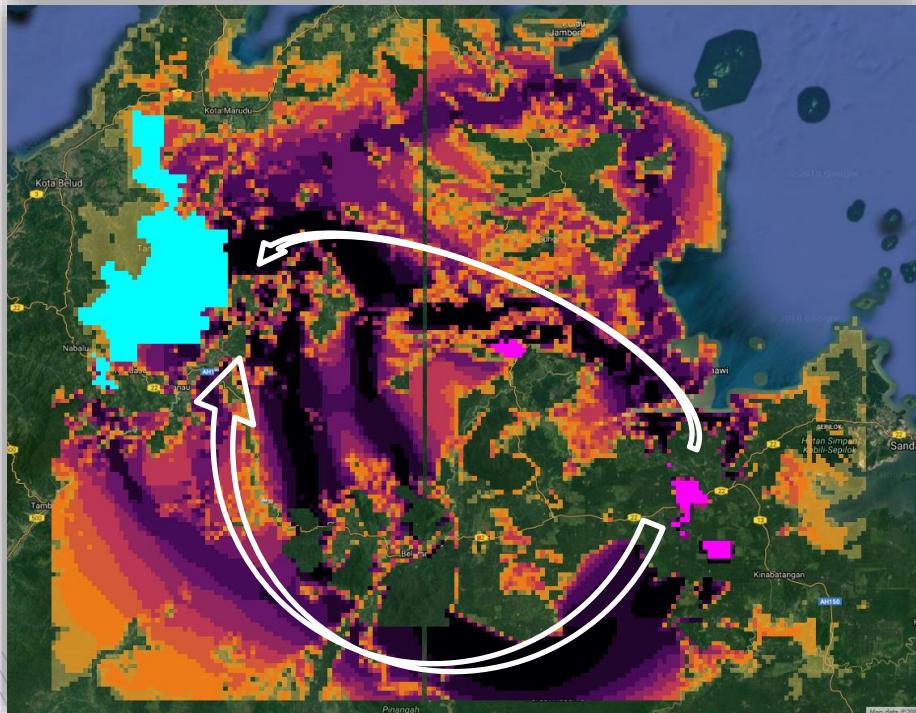


Fig. 6: The progress of movement from source to target is illustrated by the colour ramp. Bands of similar colour lie at a similar effective distance between the source and the target, e.g. a value of 50%, as demonstrated in the legend, represents the cells the species is expected to reach within half of the total 'travel' time. The source and target are labelled using MAGENTA and CYAN respectively.

*Are there bottlenecks in the landscape or is speed of movement relatively uniform across the landscape?*

# Dropping analysis

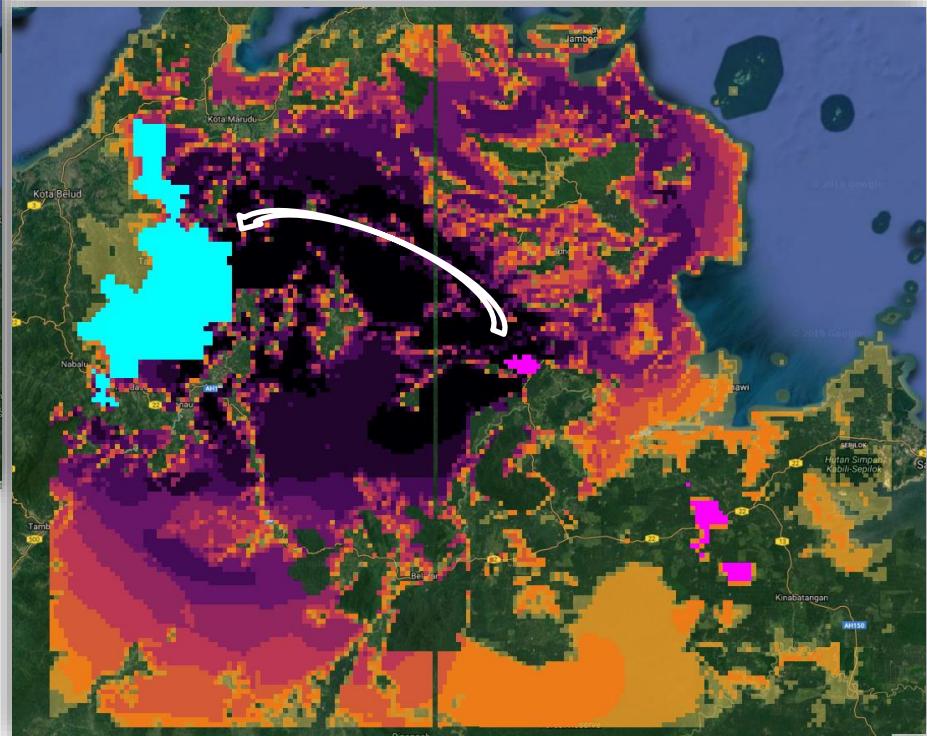
*Given limited resources for conservation, which habitat patches are the most important to protect for long-term connectivity between lowland PAs and Mount Kinabalu?*



PA2

Comparing **Dropping Rank**

PA4



# Synthesis

**FLOW:** *As the climate gets warmer, which routes will populations of heathlands use to move from the south of England to the north?*

- Which routes does your species of interest take to move through the landscape (i.e. pathways of highest *flow*)?
- How quickly does your species reach its target (i.e. number of generations to cross the landscape)?
- Are there differences in speed and progress between the different dispersal distances? Why?
- Where are the barriers to movement and what are they?

**DROPPING:** *Given a desire and resources to protect more of Sabah's forest, which are the currently unprotected forest habitats that are a priority to protect to ensure long-term connectivity between lowland PAs and Mount Kinabalu?*

- Are there common routes for the movement of wildlife from different lowland PAs to Mount Kinabalu?
- Are there common barriers?
- Where would we recommend more habitat is protected?

# SABAH PROTECTED AREAS – Other considerations





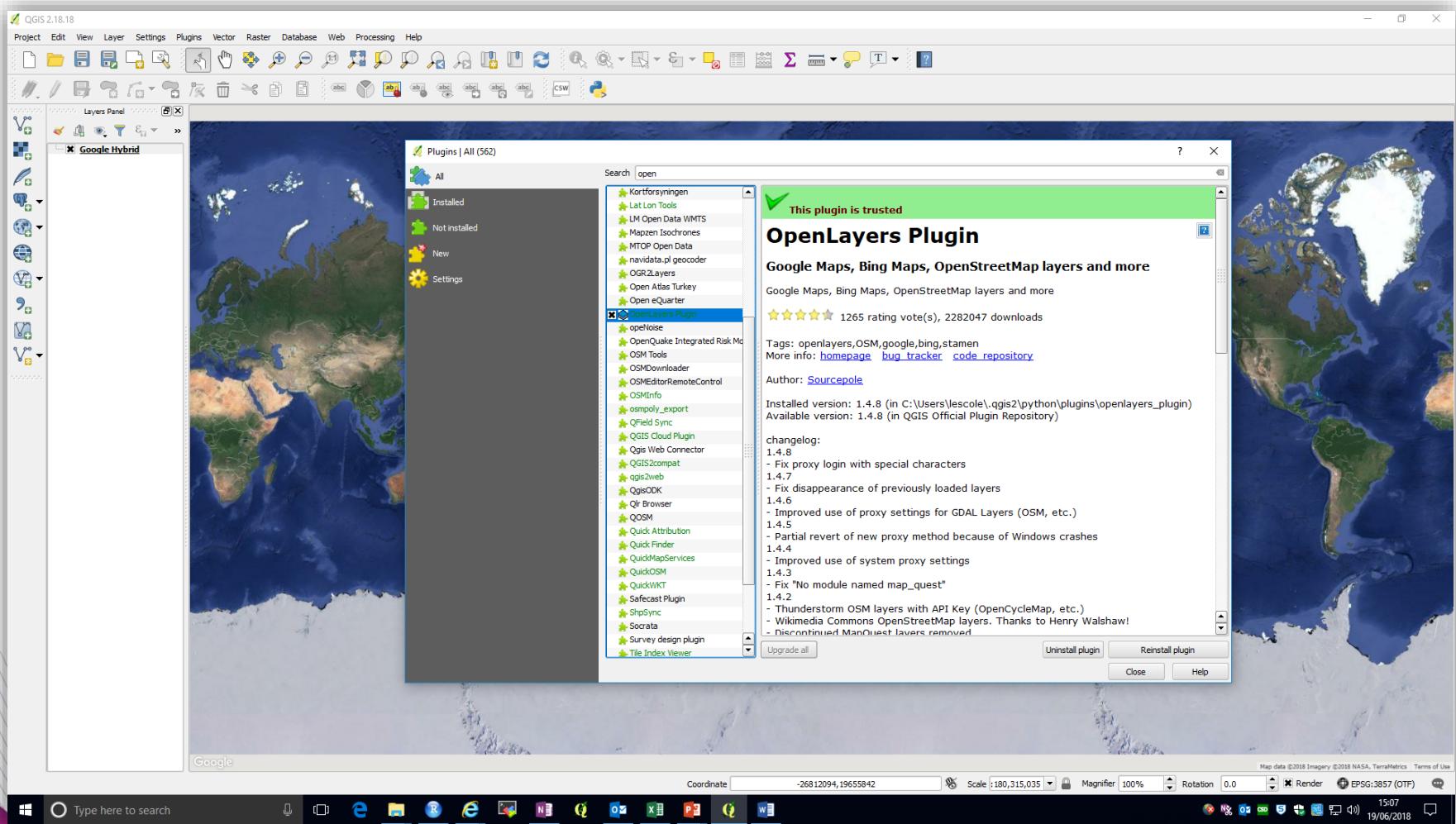
condatis



Any Qs....please get in touch:  
[contact@condatis.org.uk](mailto:contact@condatis.org.uk)

# Visualising results

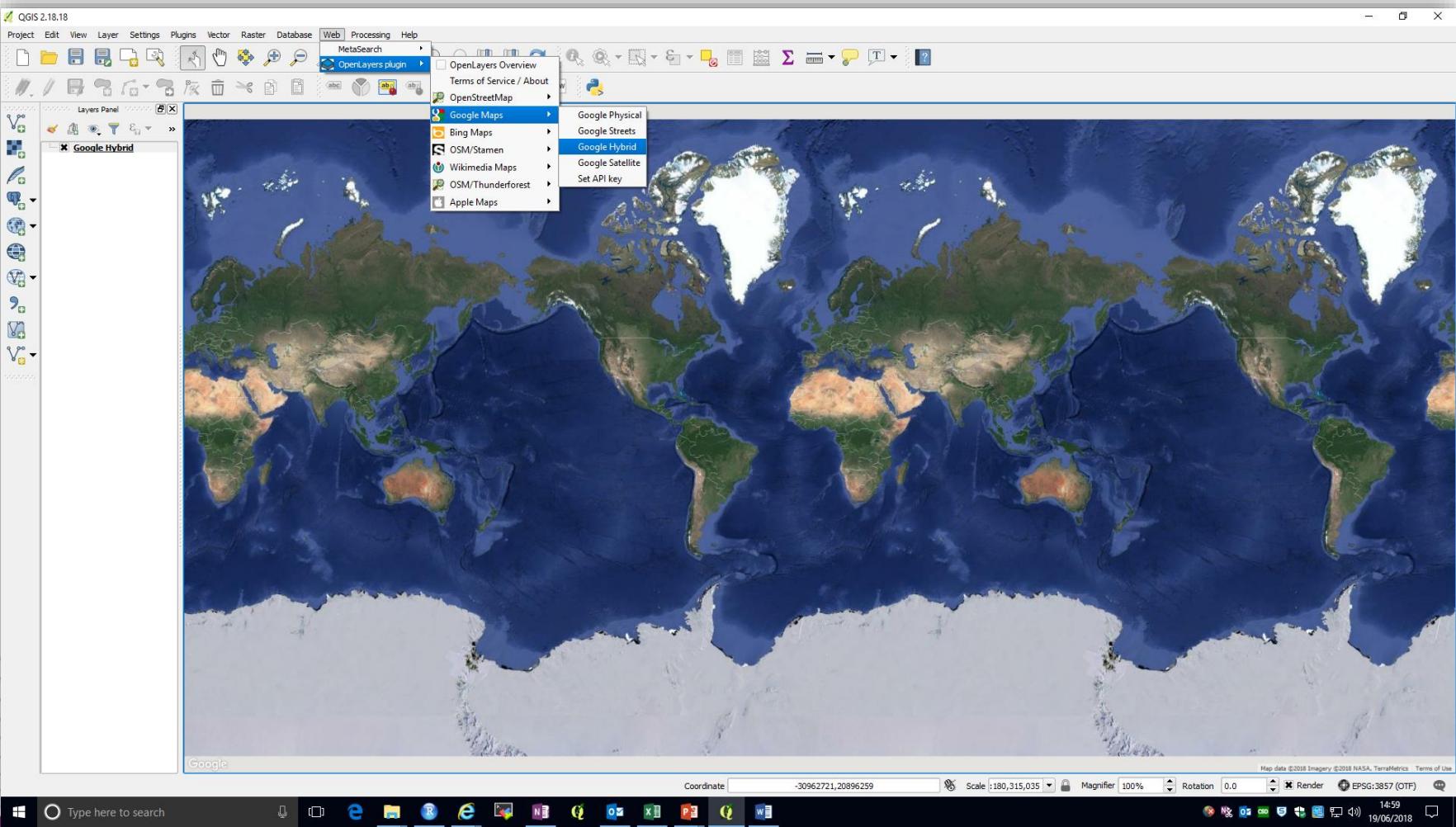
Add base map



*Plugins → Manage and install Plugins → OpenLayers Plugin*

# Visualising results

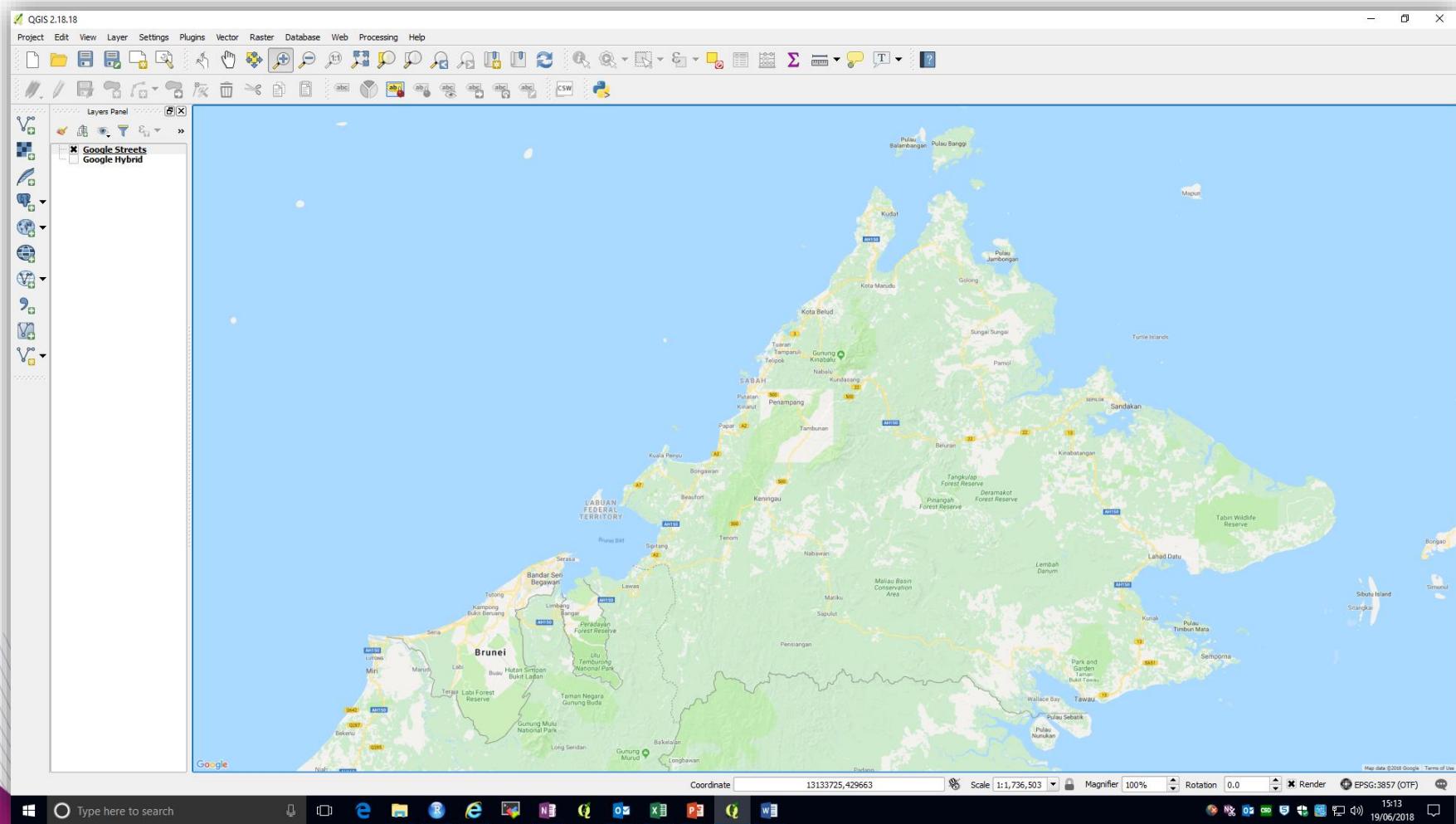
Add base map



*Web → OpenLayers Plugin → Google/Bing....*

# Visualising results

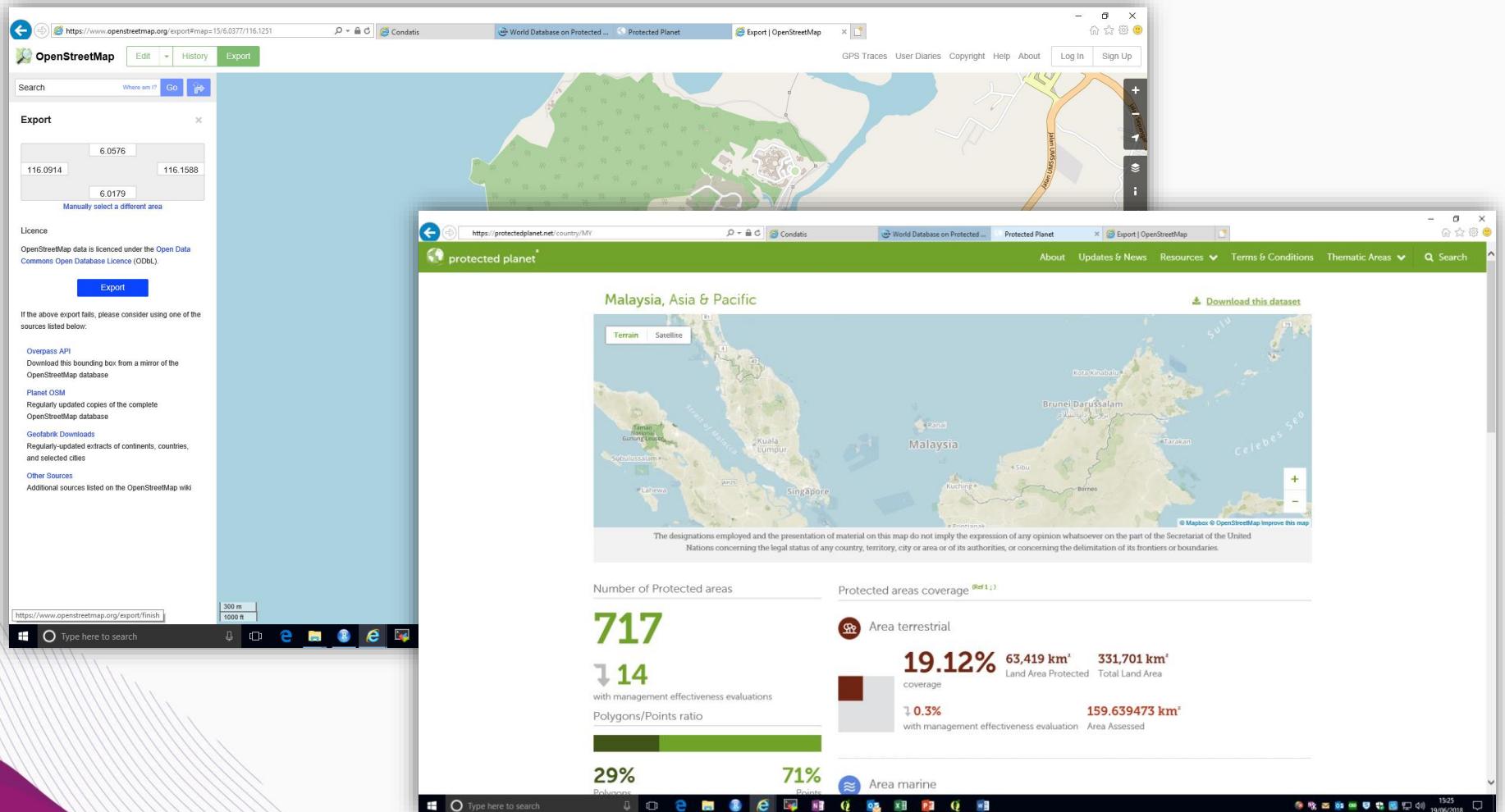
## Add base map



Google Streets

# Visualising results

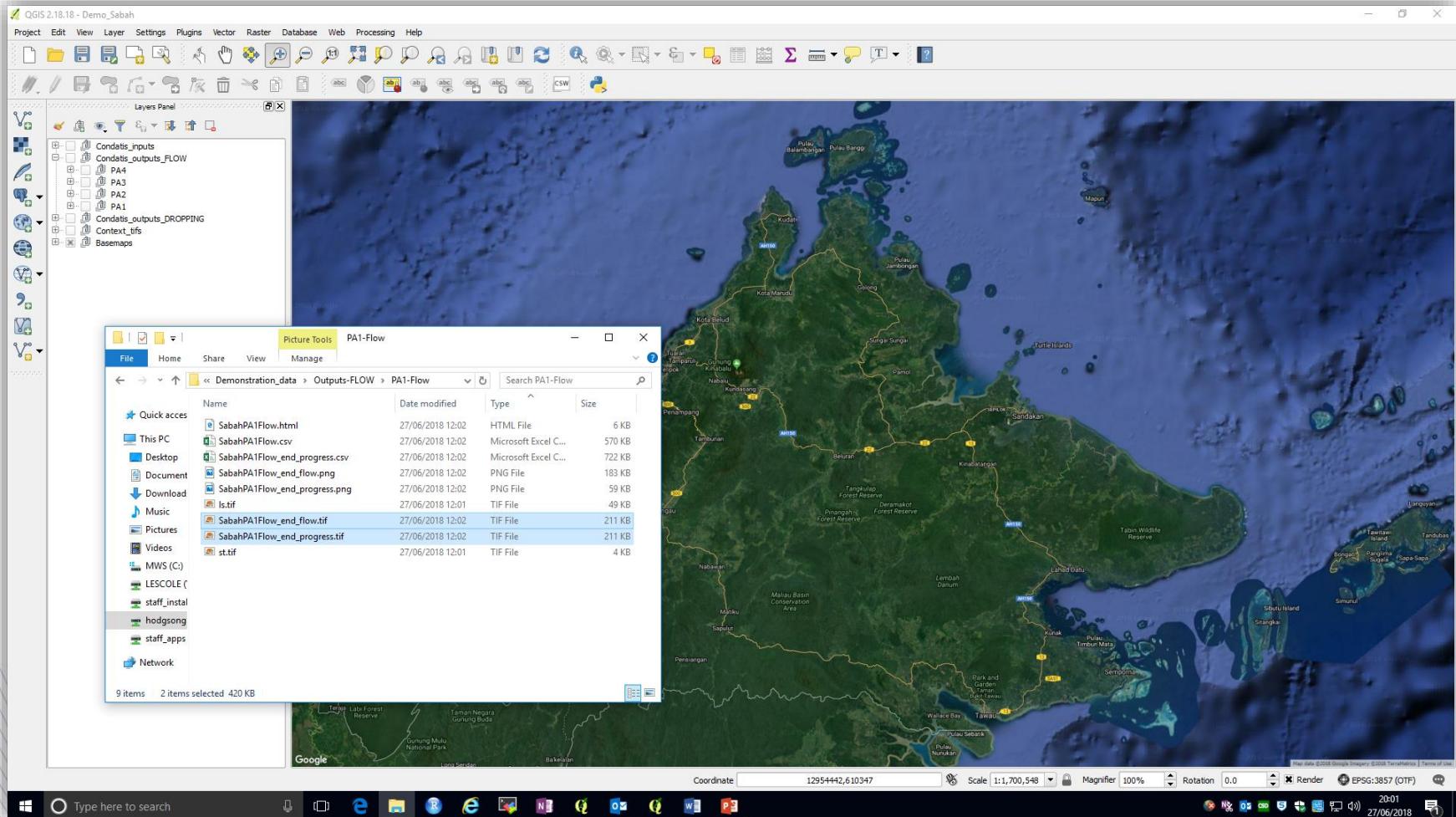
Add layers for context



*Open Street Map, World Database on Protected Areas,  
Temperature (current & future)*

# Visualising results

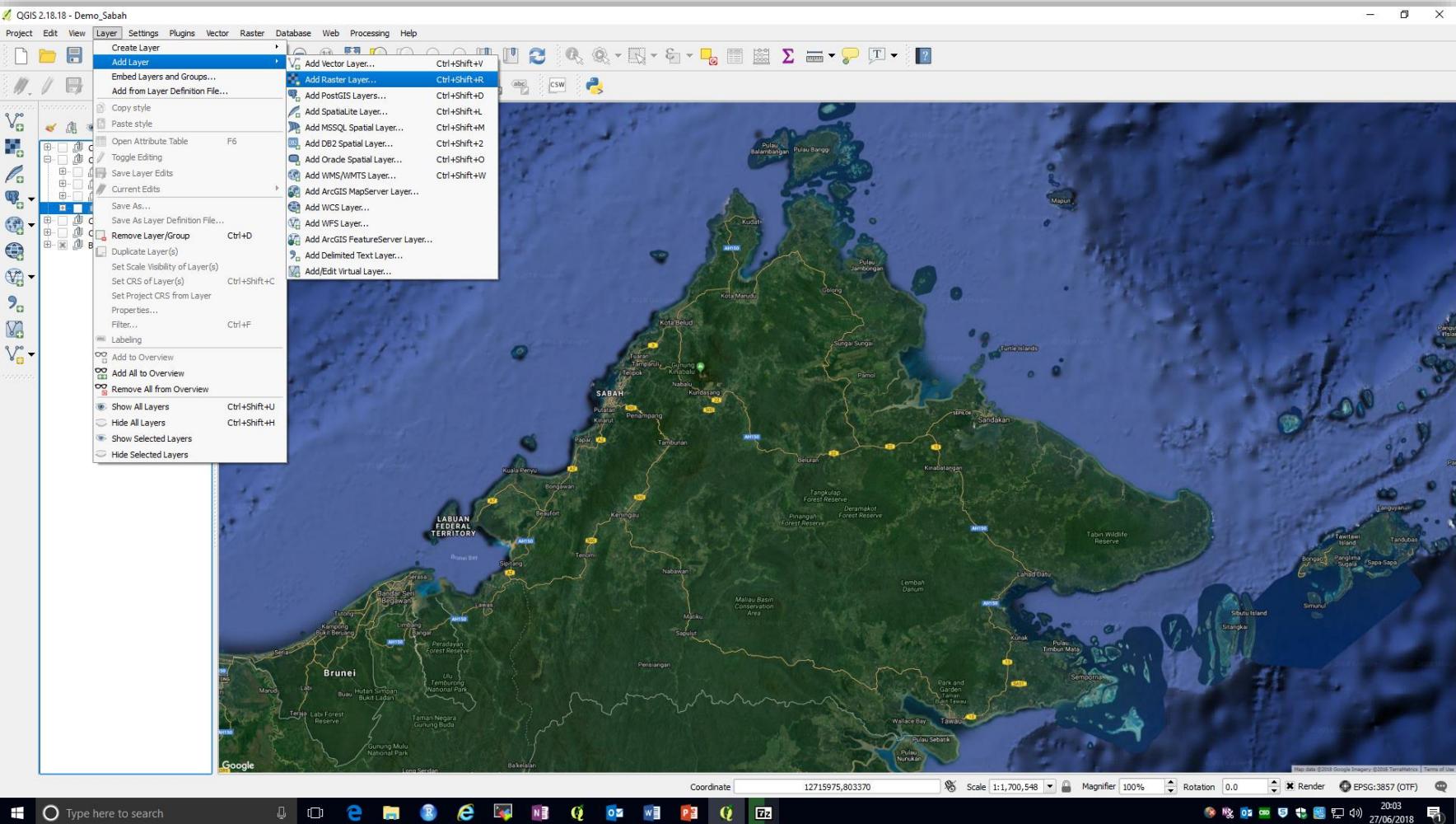
## Display results in QGIS



Import results –  
Drag & drop

# Visualising results

## Display results in QGIS



Import results files –  
Add Layer