

DSC Analysis

Distance Sample Count — Wildlife Survey Analysis Pipeline

dsc_analysis

This guide walks you through configuring and running the Distance Sample Count (DSC) Analysis workflow, which ingests wildlife survey patrol data from EarthRanger, calculates distance sampling geometry, labels transects with satellite-derived environmental covariates, and exports analysis-ready datasets for population density modelling.

Overview

The workflow supports **multiple surveys per run**. For each configured survey it produces:

Output	Format	Description
<code>{survey}_analysis_metadata</code>	CSV	Survey event metadata — transect IDs, team members, observer counts, event types, lat/lon
<code>{survey}_analysis_data</code>	CSV	Wildlife observations enriched with off-transect distances, orthogonal distances, estimated animal positions, HLS NDVI, and terrain slope
<code>{survey}_events</code>	GeoPackage	Spatial point layer of wildlife observations with key distance sampling geometry columns

Output	Format	Description
<code>{survey}_trsects</code>	GeoPackage	Visited transect lines labelled with mean NDVI and slope from Google Earth Engine
<code>{survey}_orig_trsects</code>	GeoPackage	Unprocessed transect lines as fetched from EarthRanger (EPSG:4326)

Prerequisites

Before running the workflow, ensure you have:

- Access to an **EarthRanger** instance with DSC patrol data logged using:
 - `distancecountpatrol_rep` — survey metadata (transect ID, team, observer count)
 - `distancecountwildlife_rep` — wildlife observations (species, count, distance, radial angle)
- A **Google Earth Engine** service account configured in Ecoscope (for NDVI and slope imagery)
- The **EarthRanger spatial group ID** for each survey's transect lines
- The **patrol type ID** (numeric or UUID) for the DSC patrol type in EarthRanger

Step-by-Step Configuration

1 Add the Workflow Template

In Ecoscope, go to **Workflow Templates** and click **Add Workflow Template**. Paste the GitHub repository URL into the **Github Link** field and click **Add Template**.

`https://github.com/wildlife-dynamics/dsc_analysis.git`

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Add Workflow Template Back to Library

Github Link

Browse Catalog

Import a Local Folder

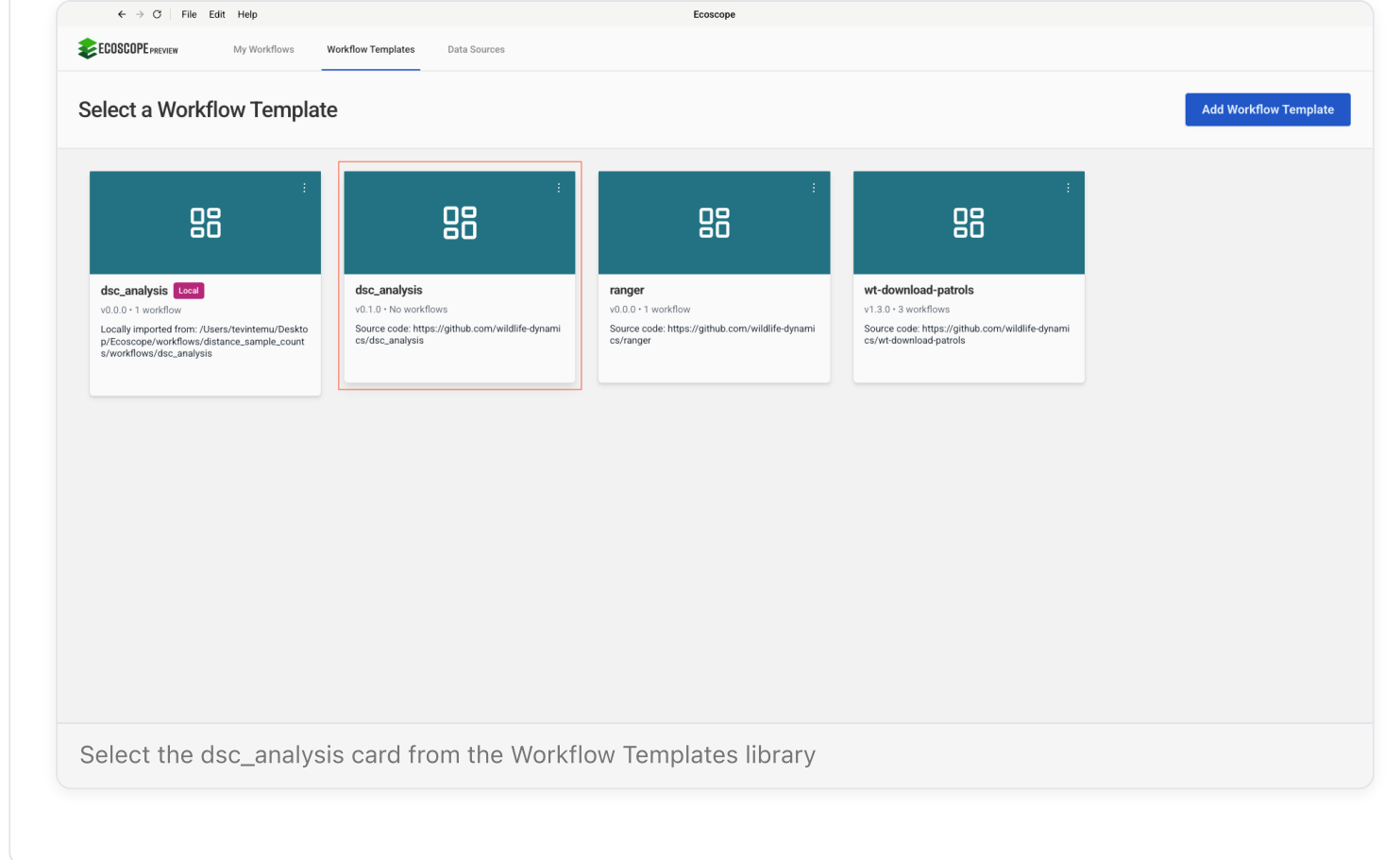
Add Template Cancel

Add Workflow Template — paste the repository URL and click Add Template

2 Select the Workflow

After the template is added it appears in the **Workflow Templates** list as **dsc_analysis**. Click the card to open the workflow configuration form.

Note: The card may show *Initializing...* briefly while the environment is set up.



3 Set Workflow Details and Time Range

The configuration form opens with two sections at the top.

Set Workflow Details

Field	Description
Workflow Name	A short name to identify this run (required)
Workflow Description	Optional notes, e.g. survey season or region

Time Range

This field is required on all Ecoscope workflows. It is used for timestamp display and UTC conversion only — it does **not** filter which patrol events are fetched from EarthRanger. Each survey's own time window (configured in Step 5) controls which data is pulled from EarthRanger.

Tip: Set this to a window that broadly covers all surveys in the run, or leave it wider than needed — it will not cause over-fetching.

Field	Description
Timezone	Local timezone for display, e.g. <code>Africa/Nairobi (UTC+03:00)</code>
Since	Broad start boundary covering all surveys in this run
Until	Broad end boundary covering all surveys in this run

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dsc_analysis

Configure New Workflow

Workflow Templates > Workflow Configuration

Set Workflow Details

Time Range

Configure Google Earth Engine connection

Configure EarthRanger connection

Set Workflow Details

Add information that will help to differentiate this workflow from another.

Workflow Name*

Workflow Description

Time Range

Choose the period of time to analyze.

Timezone *

Africa/Nairobi (UTC+03:00)

Since *

04/05/2026, 12:00 AM

The start time

Until *

03/06/2026, 11:59 PM

The end time

Configure Google Earth Engine connection

CancelSubmit

Set Workflow Details and Time Range — the first two sections of the configuration form

4 Configure Google Earth Engine Connection

Select your Google Earth Engine service account from the **Data Source** dropdown. This connection is used to build HLS NDVI composites and terrain slope images for transect labelling.

Note: Only one GEE connection is needed — it is shared across all surveys in the run.

The screenshot shows the Ecoscope configuration window. On the left is a sidebar with a tree view containing: 'Set Workflow Details', 'Time Range', 'Configure Google Earth Engine connection', and 'Configure EarthRanger connection'. The main panel has a 'Workflow Description' text area at the top. Below it is the 'Time Range' section, which includes a 'Timezone' dropdown (set to 'Africa/Nairobi (UTC+03:00)'), a 'Since' date field (04/05/2026, 12:00 AM), and an 'Until' date field (03/06/2026, 11:59 PM). The 'Configure Google Earth Engine connection' section is highlighted with a red border; it contains the instruction 'Select one of your configured data sources.' and a 'Data Source*' dropdown menu with the value 'ee_poc_two'. Below this is the 'Configure EarthRanger connection' section, which has an 'Entries' label and an 'Add' button. At the bottom right of the main panel are 'Cancel' and 'Submit' buttons. A footer bar at the bottom of the window contains the text: 'Configure Google Earth Engine connection — select your GEE service account'.

5 Configure EarthRanger Connection and Surveys

Scroll down to **Configure EarthRanger connection** and click **+ Add** to add an EarthRanger site entry.

EarthRanger Connection

Field	Description
Data Source	Select the EarthRanger connection from the dropdown (e.g. Amboseli Trust for Elephants)
Patrol Type ID	The numeric or UUID identifier for the DSC patrol type in EarthRanger

The screenshot shows the Ecoscope application interface. On the left is a sidebar with navigation options: 'Set Workflow Details', 'Time Range', 'Configure Google Earth Engine connection', and 'Configure EarthRanger connection'. The main content area is titled 'Configure EarthRanger connection' and contains the following fields:

- Entries**: A section header for the list of connections.
- EarthRangerConnection**: A dropdown menu to select a data source. The selected value is 'Amboseli Trust for Elephants'.
- Patrol Type ID***: A text input field for the patrol type ID. Below it is a note: 'Numeric or UUID identifier for the patrol type in EarthRanger.'
- Surveys**: A section header for the list of surveys.
- + Add**: A button to add a new survey.
- + Add**: A button to add a new connection.

At the bottom of the interface are 'Cancel' and 'Submit' buttons. A footer bar at the very bottom reads: 'Configure EarthRanger connection — select your data source and enter the patrol type ID'.

Surveys

Under the connection entry, click **+ Add** inside the **Surveys** section to define each survey. Multiple surveys can be added under a single EarthRanger connection.

Field	Description
Survey Name	A unique name for this survey — used as the output filename prefix (e.g. <code>Amboseli_Elephant_Survey_Q1_2026</code>)
Since	Start of the data fetch window — patrol events on or after this time are retrieved from EarthRanger
Until	End of the data fetch window — patrol events up to this time are retrieved from EarthRanger
Timezone	The timezone for this survey's time window
Transects Group ID	The EarthRanger spatial group ID that contains the transect line features for this survey

Survey Name*

A unique name identifying this survey (e.g. Amboseli Elephant Survey Q1 2026).

Time Range

The date/time window covered by this survey.

Since*

dd/mm/yyyy, --:-- --

Until*

dd/mm/yyyy, --:-- --

Timezone

Label*

Tzcode*

Name*

Utc*

Time Format

The time format

Transects Group ID*

EarthRanger spatial group ID that contains the transect features.

Cancel Submit

Survey details — fill in the name, time window, timezone, and transect group ID for each survey

Multiple surveys: To run multiple surveys from the **same EarthRanger site**, add additional entries in the **Surveys** list within one connection entry. To run surveys from **different EarthRanger sites**, click the outer **+ Add** button to add a second connection entry.

Running the Workflow

Once all parameters are configured, click **Submit**. For each survey the workflow will:

- 1 Fetch patrol events matching the configured patrol type ID and survey time window from EarthRanger.

- 2 Fetch transect lines from the configured EarthRanger spatial group.
- 3 Retrieve individual wildlife observation events from the patrol event IDs.
- 4 Process and normalise survey metadata events — extract transect ID, team members, and observer count.
- 5 Propagate metadata fields to wildlife observation rows using backward/forward fill within each patrol.
- 6 Reproject events and transects to a UTM coordinate system for metric distance calculations.
- 7 Calculate the perpendicular distance from each observer position to the `off_transect_dist`).
transect centreline (
- 8 Estimate the true animal position from each observation's radial angle and `dist_to_centre`).
distance to centre (
- 9 Calculate the orthogonal distance from the estimated animal position to the transect `ortho_dist`).
centreline (
- 10 Filter events to those that intersect a 500 m transect buffer corridor; discard unvisited transects.
- 11 Label visited transects with mean HLS NDVI (max 30 % cloud cover) and terrain slope from Google Earth Engine (30 m resolution).
- 12 Merge transect covariates into the wildlife observation dataset.
- 13 Export all outputs per survey to `$ECOSCOPE_WORKFLOWS_RESULTS` .

Output Files

All outputs are written to `$ECOSCOPE_WORKFLOWS_RESULTS/` . Five files are produced for **each survey** — `{survey}` is replaced by the Survey Name you entered in Step 5.

```
{survey}_analysis_metadata.csv
```



Survey metadata events: transect IDs, team members, observer counts, event types, lat/lon



{survey}_analysis_data.csv

Wildlife observations with all distance sampling fields: species, total count, juveniles, `dist_to_centre`, `radialangle`, `off_transect_dist`, `ortho_dist`, estimated geometry, `NDVI_HSL`, `slope`, `survey_id`, and more



{survey}_events.gpkg

Spatial point layer of wildlife observations. Columns: `serial_number`, `transect_id`, `dist_to_centre`, `ortho_dist`, `intersects_transect`, `geometry`



{survey}_transects.gpkg

Visited transect lines in EPSG:4326 with `NDVI_HSL`, `slope`, and `img_date_hsl_ndvi` columns



{survey}_orig_transects.gpkg

Original unprocessed transect lines as fetched from EarthRanger (EPSG:4326)