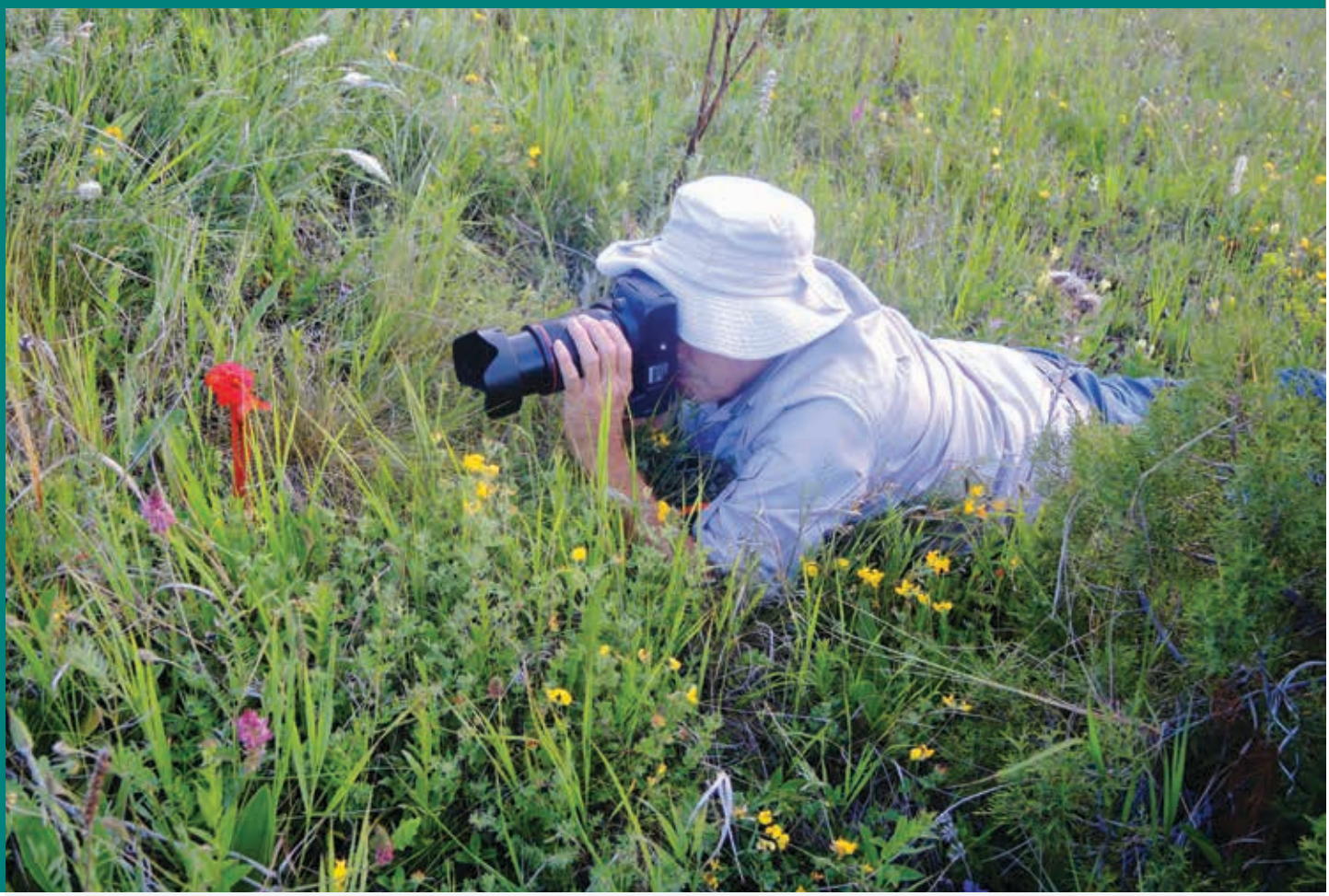
Brief 1: How to carry out an eco-geographical survey

This brief was summarised by Yvette Harvey-Brown (BGCI) from Chapter 7 of BGCI's and IABG's Species Recovery Manual



Introduction

To be able to identify the most appropriate recovery actions for the target species, it is essential that you have a clear understanding of the current and historic status of the species in its natural habitat, including what has led to the decline of the species. To do this you should conduct a desk study and field work, followed by analysis of the data collected.

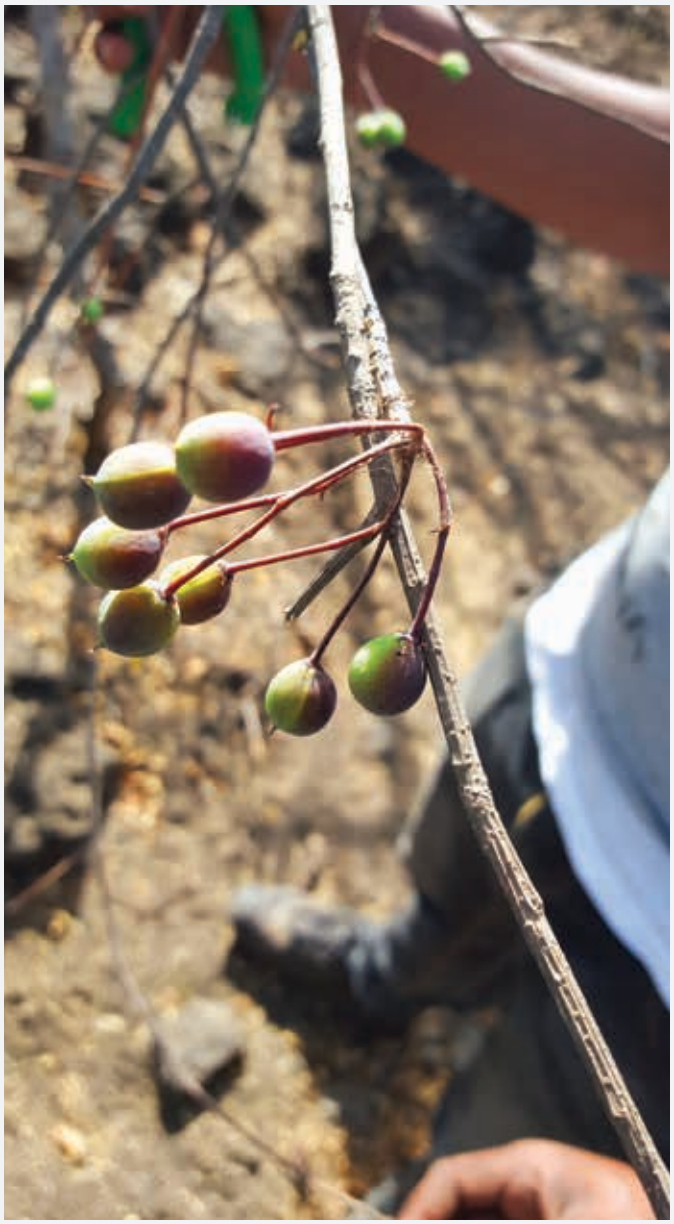
Eco-geographical survey

The process of gathering and synthesising information on ecological, geographical, taxonomic and genetic diversity.

Why conduct an eco-geographical survey?

An eco-geographical survey can:

- **Guide your species recovery programme and help to ensure its success**
- **Help you to leverage funding for a species recovery programme by demonstrating a comprehensive understanding of the species' status and needs to funders**
- **Provide a baseline against which to measure progress and success (or otherwise) of your recovery programme.**



Creating a knowledge baseline

A strong knowledge baseline can be developed through a combination of a desk study and field work. Desk studies are usually less expensive than field work, however practical survey work will ensure a current and more in depth understanding of the target species.

Collecting the following information will enable you to have a better understanding of the species' requirements for survival and the threats that resulted in the species decline.

Factor	Description
Taxonomy and nomenclature	Taxonomic knowledge is required to ensure material surveyed and sampled is correctly identified.
Ecology of the species	Habit, growth rate, reproduction mechanisms, pollination, seed dispersal, population structure, seed storage behaviour, predators, diseases, etc.
Genetic information	Estimate of effective population size, amount of genetic variation within populations and assessment of gene flow between populations.
Habitat preferences	Habitat type, distribution, associated species, soil type, soil moisture content, aspect, climate/ microclimate.
Cultivation requirements	What is the best watering/ fertilising regime? Are there any mycorrhizal or nurse species associations that can improve survival and growth rates?
Human interactions	Human induced threats and uses of the species.

TOP TIP ***The more information that can be gathered about a species prior to designing and initiating your recovery programme, the more successful the programme will be.***

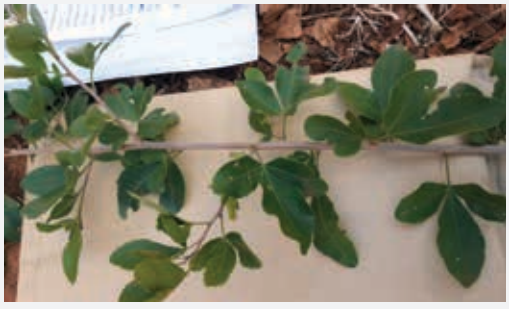
Desk studies

Carrying out desk-based research for the species concerned is a cheap and effective way of gathering information. Below are some useful information sources that you can consult.

Source	Description	Useful links
Species description	Often include details of growth habit and habitat preferences.	- Jstor Plants (plants.jstor.org) - GBIF (www.gbif.org) - Plants of the World Online (www.plantsoftheworldonline.org)
Conservation assessment	Can contain information on distribution, population status, conservation management actions/recommendations and threats.	- BGCI's ThreatSearch Database (www.bgci.org/threat_search.php)
Herbarium records	Often contain notes on locality, associated species, habit and habitat type. Many herbaria allow people to visit for research purposes and digitised specimens can be viewed online.	- Jstor Plants (plants.jstor.org) - GBIF (www.gbif.org) - Tropicos (www.tropicos.org)
Published journal articles	More in-depth information is often published in scientific journal articles.	- Google Scholar (scholar.google.co.uk)
Websites/books	You can search for information on cultivation requirements, seed storage and whether conservation actions have been undertaken previously.	- BGCI PlantSearch Database (www.bgci.org/plant_search.php) - Kew Seed Information Database (data.kew.org/sid/)
Historical photographs of habitat	Image search engine or visit a national archive/local museum to see if historical images are available.	
Point/location information	GPS point data can be used to make a current or past distribution map.	- Kew's GeoCat tool (geocat.kew.org/)
Habitat/vegetation/land cover maps	Comparing point data to habitat or vegetation maps, will enable identification of appropriate vegetation type for the target species.	- ArcGIS (www.arc.gis.com) - ESRI (www.esri.com)

TOP TIP

If the target species is not well studied, it is recommended that you look for information available on species of the same genus, or family, as in some cases they may share some of the same eco-geographical features.



Field work

During field work additional data can be collected to supplement the desk study, as well as photos, herbarium vouchers or plant samples if needed. If sufficient budget is available, repeat the field work in different seasons to capture additional information.

Before you go into the field:

1. **Check if permission is required to carry out your field survey. Additional permissions may also be needed to collect herbarium vouchers, seed or DNA samples.**
2. **Make sure suitably qualified team members have been identified for field work.**
3. **Ensure appropriate equipment is sourced for the survey.**
4. **Consider carrying out a risk assessment or having an emergency response plan. This is particularly important if the target species is found in a remote area.**

What information to collect

Decide what data to collect before going into the field and prepare a form to ensure all required information is collected at each site or population. See Page 5 for an example format and suggested information to collect. Forms can be prepared in a notepad, Excel or Word then printed; a laptop or tablet can be carried in the field or a form can be developed and downloaded to a mobile phone (e.g. using www.opendatakit.org).

TOP TIP ***If paper forms or a notepad are used, take a photo of the form whilst in the field in case it gets damaged or lost. If electronic forms are used, make sure the data is backed up as soon as possible.***

Herbarium vouchers, photos and samples

It is good practice to collect herbarium vouchers of the target and associated species in the field to provide a reference collection and to verify identification. Photos taken during field work can be compared to historical photos to show change over time and as a visual baseline to measure the impact of species recovery actions. Seed can be collected to test seed characteristics, storage requirements and germination techniques. DNA samples can also be collected for genetic analyses.

Talk with local people

Engaging the community during survey work carried out prior to commencing the species recovery actions can help to develop a relationship with the local community, who may be able to provide useful information on the target species, become involved in recovery actions and ensure the longer-term sustainability of the recovery programme. See Species Recovery Brief 4 for more detailed guidance on engaging with local communities.

Data analysis

Where the desk study and field work have been completed, it is good practice to collate this information in a report. It is advisable that you share this report with all relevant stakeholders to provide them with an opportunity to give further input on species recovery actions. This report will also be a helpful tool for fundraising to carry out identified actions.

If historic data is available, compare current and historic data to determine the rate of decline of the target species. Understanding the rate of decline can help to identify the urgency of the recovery actions.

Map as much of the data as possible. This will help visualise and interpret the data, but will also help communicate the project plan to funders and other interested parties. Photos and points can be added easily to Google maps (www.google.com/maps), or iNaturalist (www.inaturalist.org/). More detailed mapping may require GIS skills and software or employment of a consultant to map the data.

Sample data collection form

Project name	
Site ID or number	
Data recorder	
Date of survey	
Target species name	
Family	
GPS Latitude & longitude	
Altitude	
Vegetation type	
Vegetation type	
Notes on vegetation type:	(tick which applies)
Pristine	
Disturbed	
Heavily disturbed	
Species composition/associated species	
Canopy layer (list species)	
Shrub layer (list species)	
Ground layer (list species)	
Notes on species composition (e.g. invasive species)	

Threats	
Threat type	
Is this threat ongoing?	
Notes of threats	
Is this species used by local people? If yes, add details of the uses & level of exploitation	
Are there any protection measures in place for this species? If yes, add details of the protection measures and their effectiveness	
Site characteristics	
Locality type (e.g. mountain, slope, plateau, forest)	
Site soil (e.g. sand, loam, clay)	
Lithology (e.g. granite, sandstone)	
Estimated slope angle	
Site exposure level (full shade/partial shade/full sun)	
Climatic/microclimatic conditions	
Notes on site	

Population information	
Number of alive individuals present	
Number of alive mature individuals present	
Number of juvenile individuals present	
Was the population number counted or estimated? If quadrats were used, what was the quadrat size?	
Is there evidence of natural regeneration?	
Number of dead individuals present	
Cause of death	
Notes on population	

Samples	
Type of material collected (seed, herbarium voucher, DNA sample)	
Seed specimen number	
Number of seeds collected from population	
Purpose of collection	
Herbarium voucher number	
Number of duplicated vouchers taken	
Purpose of collection (e.g. to verify ID)	
DNA specimen number	
Number of DNA samples collected from population	
Purpose of collection	

Photo checklist			
Habitat/site		Flower	
Canopy layer		Seed	
Shrub layer		Leaf arrangement	
Ground layer		Bark	
Full plant		Evidence of threats	
WHEN COMPLETE TAKE A PHOTO OF THIS DATA COLLECTION FORM			

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