DEPARTMENT OF LAND RESOURCE MANAGEMENT

Weed Data Collection Manual

Section One Technical Data Description

NORTHERN TERRITORY GOVERNMENT

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1. INTRODUCTION

The Department of Land Resource Management (DLRM) is the lead agency for weed management in the Northern Territory (NT).

Consistent and reliable data is a requirement for strategic and effective weed management and assists the Weed Management Branch to assess both the density and location of weed species and the movement of weeds into new areas. The data supports decision making, guides control measures and also assists reporting to funding bodies.

1.1 Purpose

The *Northern Territory Weed Data Collection Manual* provides standards and guidelines to assist data managers, researchers and land management agencies to utilise weed data held by the Northern Territory Government and to allow them to contribute weed data in the most effective way.

Section one   Provides an overview of weed data collection and management.

Section two   Provides technical data description for the NT weeds dataset and contains metadata, a data dictionary, and a comprehensive list of NT weed species and their status.

The Manual provides a procedure for weed data collection and management that is flexible enough for varying needs of individual land managers but retains enough structure to allow wide scale planning and reporting.

1.2 Related Documents

This Manual is intended to work with the technical flyer; *'A field guide to mapping weeds in the NT'* which describes good practices for organisations that collect and store weed data and provides a guide for field based workers who just need to know how to collect and supply weed records effectively (Appendix A).

The Weed Management Branch also produces and distributes a Weed Data Collection pocket book for recording data in the field. Examples of data collection sheets from the pocket book are provided in Appendix B.

1.3 Northern Territory weed data

Data collected is compiled and managed according to accepted protocols, with the Director of the Weed Management Branch in the role of custodian for all spatial datasets. Data received is processed for quality assurance and to ensure that the required core set of attributes is maintained.

When using weed data it is important to recognise that weed records are inherently incomplete, and limited in their ability to fully represent current weed distributions. Caution is required in the interpretation of the data. *Where decisions concerning significant economic or environmental values are being made based on the weeds dataset it is strongly recommended that expert advice be sought directly from the Weed Management Branch*.

1.4 How the NT Weed Dataset is used

The NT Weed Dataset guides the understanding of present and emerging weed issues in the Northern Territory. It is used in conjunction with the Weed Risk Assessment (WRA) process, the Northern Territory Weed Advisory Committee (NTWAC) and the advice of the various funding bodies and land managers to make decisions about the priorities for weed management.

Many groups operate on land that they do not necessarily own, some examples being mineral explorers and miners, roads and construction projects, and utility providers. These groups use the NT weed dataset to guide operations around weed problem areas or conduct hygiene procedures where such areas cannot be avoided.

Most landowners and land managers are, by necessity, focused on weed issues of the property for which they are directly responsible. The ability to access weed data for a wider area allows them to easily consider their own weed issues in the context of the catchment, locality or region. For example, if a new weed is discovered on a property it is useful to see if it has become widespread elsewhere in similar areas, or if it has washed downstream from larger infestations.

1.5 Weed data collection standards

The basis for the Northern Territory weed data collection standards is the document; *A Field Guide for Surveying and Mapping Nationally Significant Weeds*. Originally designed to allow sharing of weed data between states, this field guide is well suited to accommodating the varied needs of different land tenures, and covering the vast distances of the Northern Territory. The field guide recommended that 13 core data attributes should be recorded to adequately describe an area of weed infestation. Seven of the 13 core attributes were endorsed by the Australian Weeds Committee (AWC) as a suitable national standard for mapping weeds (AWC meeting number 10, 2005). These form the basis of the guidelines for mapping Weeds of National Significance (WoNS).

The data collection standards used by the Weed Management Branch of DLRM were adapted from WoNS standards to accommodate local needs but remain compatible with national data collection methods.

1.6 Contributing data

Information about weed infestations is regularly provided to the Weed Management Branch by land managers, community groups, indigenous land organisations, contractors and local, Territory or Commonwealth Government agencies. It is recommended that data is provided in a digital form as either a spreadsheet table or a shapefile, ideally following the template style provided in Appendix C. To ensure records are useful, care should be taken that all core attributes described in *Section 3. Attributes for data collection* are provided. The Branch should be contacted if assistance is required with the method or format of weed records. Contact details are provided at Appendix D.

Data providers are advised that data submitted to the Weed Management Branch becomes the common property of the Northern Territory and will be made available to the public on request where such requests are in the public interest. The rights of the data creator, including commercial property rights, remain with the provider and protected by Creative Commons Attribution 3.0 Australia License.

All land managers are strongly encouraged to submit their data to the Weed Management Branch in order that decisions can be made on the basis of the best available data. It is inherent in land managers' interest to submit data, as without current weed data, the extent of weed issues or control effort on a given land area may be misrepresented. Further, incomplete weed data provided to external land users can result in the accidental spread of weeds on landholders' property. External resources for weed management are more likely to be invested in an area where rigorous data supports evidence of a weed problem.

1.7 Accessing data

Weed data provided to, or collected by, the Weed Management Branch is available to the public for uses that are in the public interest. There is no charge for data as such but where requests are more extensive or complicated a charge will be made for the time taken to assemble and collate the data.

Users accessing this data are required to acknowledge the limitations of the data and to agree to licensing conditions under the **Creative Commons Attribution 3.0 Australia License**, which permits use on a 'not for profit' basis whilst protecting the creators rights to the data. A copy of this license can be view at http://creativecommons.org/licenses/by/3.0/au (Creative Commons Attribution 3.0 Australia). Additional approvals may be required where a landholder or land management agency has contributed a comprehensive set of spatial data.

Data can be viewed through the NR Maps online mapping service (http://www.lrm.nt.gov.au/nrmapsnt) and digital data requested by submitting a form available on the NR Maps home page. Where data is required for specialised purposes such as research or for significant works or projects data users are strongly encouraged to contact the Weed Management Branch.

2. WEED DATA COLLECTION

The standard methodology described in this manual is recommended by the Branch as most suitable for a wide range of stakeholders and weed situations, whilst being relatively fast and efficient to collect. Other custom methodologies are sometimes used by the Branch to cover very large areas, such as aerial survey, roadside survey, 'grid' surveys or remote sensing. More detailed mapping methods may be applied where the systematic eradication of a weed from a localised area is required or for an intensive property scale weed plan. Assistance can be provided to design and implement such surveys.

2.1 When to use standard mapping

The NT Weed Data Collection Manual provides standard attributes and methods to effectively collect and represent weed data at local, catchment, regional and territory wide scales. Where projects work across more than one property, and where different owner groups are involved, it is essential that common guidelines be used to allow weed data to integrate across property boundaries, catchments and even across state and territory lines.

Compilation of data from different groups is difficult unless the data is in a consistent format. It is often not viable to convert custom data to a standard format, which may waste the resources and effort put into collecting that data.

2.2 When to use other mapping approaches

It may be appropriate to develop a customised method for mapping weeds when working with smaller areas, such as individual properties or research project areas, or for specific project requirements. It is important to ensure the customised weed data is easily resampled to the standard weed data format at a later time. This allows the project or site specific information to contribute to future projects or to coordinated weed strategies, as well as increasing the understanding of weeds in the landscape.

Generally, a project or property specific mapping strategy may be warranted in the following situations:

1. A more accurate definition of weed areas is required than can be achieved with points. For example, where polygons are walked around weed areas in order to apply chemical at a later date.

2. A more detailed study of the site is required than the standard attributes can record. For example, a research project may require extensive details of the native vegetation cohabiting with a weed.

3. Project specific reporting requirements exist. For example, funding may be targeted to number of participants rather to weeds targeted.

In all the above cases, use of the standard density classifications is still applicable, as is use of weed naming conventions defined in this manual. Early consideration of how a property based mapping approach can be scaled up to meet standard mapping guidelines can save considerable time and effort later.

2.3 Weed data collection tools

For ground based collection of weed data, the Weed Management Branch recommends either a manual paper based method in conjunction with a hand-held GPS (Global Positioning System), or digital data collection using applications available for (Windows Mobile) PDA's and (Android) smart phones/tablets with built in GPS. A suitable Apple iOS application is likely to become available in future.

Manual data entry – *Weed data collection pocket books*

This is a relatively simple, inexpensive option for the capture of weed data. *Weed data collection pocket books* (Appendix B) and template spreadsheets, which are available from the Weed Management Branch, are used to manually record information about weed infestations as single point locations using a hand-held GPS receiver. This information is transcribed to a digital version of the field sheet using a spreadsheet eg: Microsoft Excel and sent to the Weed Management Branch (See example at Appendix C).

Digital GIS data entry – Arcpad, Arc Collector and Cybertracker

The Weed Management Branch often uses a PDA or Android device with a GPS to record information about weed infestations. Pre-set data entry lists for recording NT weed species (Section 2) are available for Cybertracker® software and ArcPad® or Arc Collector® (purchased from ESRI) software. This data collection method requires relatively expensive equipment and some skill, knowledge and experience using the collection software. However, the increased speed and accuracy of data collection makes this approach more cost effective for groups intending to collect a large amount of weed data.

The data is saved and downloaded in a shapefile format or as an Excel spreadsheet. This data can then be submitted directly to the Weed Management Branch where it will be merged with the NT Weeds Datasets.

Data collected in the field is converted to a format suitable for use in a Geographic Information System (GIS). The Weed Management Branch currently uses the software ArcGIS and stores the final datasets in shapefile format for data management and mapping display. The final data format is structured to fit the national model using the core attribute groupings. All data is merged together to cover the Northern Territory and is referred to as the **NT Weeds Dataset**.

Figure 1: Weed Management Officer documenting a mimosa occurrence in the field

3. ATTRIBUTES FOR WEED DATA COLLECTION

Attribute describes additional information collected about a weed point, for example the type of weed is an attribute, as is the density of weed at that point.

Attributes have *Type* properties that define what data you can enter to describe the attribute, for example some attributes can only be a number, others may only be a yes/no answer. The meaning of the terms *Attribute* and *Field* are slightly different in their database design usage but for practical purposes they can be considered the same, such as when reading help files and instructions.

This version of the Northern Territory Weed Data Collection Manual has made significant changes from version 1.0 released in 2007. These changes are largely aimed at making it easier to collect the minimum data required to form a weed record compliant with the standard.

The key change is the 31 compulsory attributes in version 1.0 are now divided into CORE, RECOMMENDED and OPTIONAL.

Table 1: Attributes types and description

Attribute type	Description
Core attributes	These are the minimum requirements to establish a reliable, valid record with useful information for operational and strategic weed planning.
Recommended attributes	The Weed Management Branch recommends collection of this data to improve and evaluate the effectiveness of control effort and weed impacts over time.
Optional attributes	Optional attributes are useful for operational planning within an organisation, for particular project requirements or for property scale weed planning. Records submitted to the Weed Management Branch do not require optional attributes but they will be retained by the Branch if submitted. Optional attributes are defined in this manual to suggest what might be useful to organisations and to assist in maintaining consistency.

3.1 Core Attributes

These are the minimum requirements to establish a reliable, valid record with useful information for operational and strategic weed planning. Weed records missing core attributes are generally not reliable enough for weed control planning or operation and should be discarded in most cases.

Table 2: Core attributes - description of data groupings

Data Groupings	Description
Data record	Data record identifier
Name of weed	Common and scientific name of the weed
When was the site assessed	Date of the record
Co-ordinate position	Latitude and longitude, and recording method
Who assessed it?	Person and organisation
Infestation size	Size of the infestation relevant to point, line or polygon data
Infestation description	Density category and treatment (control) type administered

Table 3: Core attributes – type, example and purpose

No	Attribute	Type	Example	Purpose
1 Data record				
1.1	ID	Index	1	Machine generated index field
1.2	SITE_ID	Text,15	25	Waypoint ID or other similar source identifier for this record applied by the observer
1.3	SITE_MON	Text,15	MONIT 1	Allocated unique site identifier to allow revisit of formal monitoring sites
2 Name of weed				
2.1	WEED_NAME	Text,40	Bellyache bush	Common name
2.2	GENUS_SPP	Text,60	Jatropha gossypiifolia	Scientific name
3 When was the site assessed?				
3.1	DATE_REC	Date, DD/MM/YYYY	21/06/2013	Date of record
4 Co-ordination position				
4.1	LAT_G94	Number, Double	-15.12345	Latitude in D.DDDDD to 5 places ie: approx 1 metre
4.2	LONG_G94	Number, Double	132.12345	Longitude in D.DDDDD to 5 places ie: approx 1 metre
4.3	REC_METHOD	Text,25	Single GPS	Method used to record coordinates
5 Who assessed it?				
5.1	RECORDER	Text,40	Phil Hickey	Person most responsible for the sighting
5.2	ORG_NAME	Text,60	Weed Management Branch	The organisation conducting the survey
6 Infestation size				
6.1a	SIZE_DIA_M	Number, Short integer	20	Size of weed affected area as a circle diameter in metres (Point only)
6.1b	WIDTH_M	Number, Short integer	11	Size of a linear weed affected area as width of the line (Line only)
6.1c	SIZE_M2	Number, Long integer	400	Size of weed affected area as calculated from enclosed polygon (Polygon only)
7 Infestation management				
7.1	DENS_CAT	Number, Short integer	3	Density of weeds in areas using 1 - 11 WoNS scale
7.2	TREATMENT	Text,40	Foliar spray	What treatment method is being applied today, or is 'No treatment' applied

3.2 Recommended Attributes

The Weed Management Branch recommends collection of these attributes to improve and evaluate the effectiveness of control effort and evaluate weed impacts over time.

Table 4: Recommended attributes - description of data groupings

Data Groupings	Description
Infestation area description	Describes the name of any ongoing project related to the record and characteristics of the site such as if seedlings, juvenile or adult plants are present, if seeds are visible, or if previous treatments have impacted the site.
Additional area information	Further information about the site at the time of the record such as; was herbicide applied, and if so, which active ingredient? Comments and a year record are included.

Table 5: Recommended attributes – type, example and purpose

No	Attribute	Type	Example	Purpose
8 Infestation area description				
8.1	PROJECT	Text,150	Weed standards manual	The project for which the survey is conducted
8.2	SEEDLINGS	Text,10	Yes	Are seedlings present?
8.3	JUVENILES	Text,10	No	Are juveniles (or flowering) present?
8.4	ADULTS	Text,10	Unknown	Are seeds present (visible) at the site, either on ground or on plants
8.5	SEED_PRES	Text,10	Yes	Are seedlings present?
8.6	PAST_TREAT	Text,10	No	Are impacts from previous treatments visible at the site?
9 Additional area information				
9.1	HERBICIDE	Text,40	Glyphosate	Herbicide applied (active ingredient only)
9.2	YEAR	Text,4	2013	The year of the record as calculated from date
9.3	COMMENTS	Text,150 or Memo		Comments noted by the observer

3.3 Optional Attributes

Optional attributes are useful for operational planning within an organisation, for particular project requirements or for property scale weed planning. Records submitted to the Weed Management Branch do not require optional attributes but they will be retained by the Branch if submitted, they are generally not included in data supplied to external organisations.

Table 6: Optional attributes – description of data groupings

Data Groupings	Description
Site assessment	Plot dimensions and measures of health or disturbance at the site.
Operational factors	More detailed information about chemical control applied.
Logistics	Logistics about how and where survey or control is carried out.
Biocontrol operations	Observations relevant to biocontrol activity

Table 7: Optional attributes – type, example and purpose

No	Attribute	Type	Example	Purpose
10 Site assessment				
10.1	PLOT_LEN	Number, Short integer	10	Length of a rectangular weed area
10.2	PLOT_WIDTH	Number, Short integer	10	Width of a rectangular weed area
10.4	STEM_COUNT	Number, Short integer	25	Count of stems for woody weeds
10.5	STEM_METHD	Text,60		Method used to determine STEM_COUNT
10.6	TREAT_MON	Text,25	> 80% Success	% weeds killed by previous treatment
10.7	SITE_COND	Text,40	Very healthy	How healthy are the plants at the site
10.8	VEG_DIST	Text,40	Pig damage	Has the soil been disturbed
11 Operational factors				
11.1	SURFACTANT	Text,40	Li-700	Surfactant applied with herbicide (type or brand)
11.2	CHEM_TRADE	Text,60	Brush off	Herbicide applied (product name)
11.3	CHEM_CONC	Text, 40	1:100	Mix ratio of herbicide to water used in this treatment
11.4	ADJUVANTS	Text,40	Diammoniumsulfate	Adjuvants applied with herbicide (type or brand)
11.5	PENETRANTS	Text,40	Powermax	Penetrant applied with herbicide (type or brand)
12 Logistics				
12.1	TRANSPORT	Text,40	ATV	Vehicle used to access weed site eg: 4WD, ATV or foot
12.2	EQUIPMENT	Text,40	Quickspray	Equipment used to treat weeds eg: backpack, slasher
12.3	LOCALITY	Text,40	Rocky paddock	Name for a general operational area, generally lacks defined boundaries
12.4	PLAN_AREA	Text,40	Kakadu	Name for a defined management area eg: area subject to a weed plan
12.5	ZONE_NAME	Text,40	Four gate road	Name for a defined work zone within a plan area.
13. Biocontrol				
13.1	AGENT	Text,40	Chalcodermus	Biocontrol agent name
13.2	BIO_ACTVTY	Text,40	Release	Biocontrol activity undertaken
13.3	AGENT_PRES	Text,10	No	Presence/Absence of biocontrol agents

3.4 Summary records (Zone attributes)

Summary records or 'zone' attributes are not recorded against individual weed records, but rather are assigned to localities or defined geographic areas. They are used by some organisations to record a summary of activity within defined weed management areas and are different in nature from ordinary weed records which relate to a specific weed point or plot.

Table 8: Summary records (zone attributes) – description of data groupings

Data Groupings	Description
Summary records (zone attributes)	Relates to a defined weed management area zone, these attributes record activity applied to the whole zone using measures such as chemical applied or hours worked

Table 9: Summary records (zone attributes) – type, example and purpose

14. Summary records (zone attributes)				
14.1	ZN_NAME	Text,40	Four gate road	Defined work zone name, can link to weed records with ZONE_NAME.
14.2	ZN_TREAT	Text,100	Foliar, Glyphosate	Description of treatment applied across zone
14.3	ZN_CHEM_L	Number, Short integer	2000	Litres of herbicide (liquid) applied to a zone
14.4	ZN_CHEM_GM	Number, Long integer	200	Grams of herbicide (granular) applied to a zone
14.5	STAFF_HRS	Number, Double	16	Paid worker time applied to a zone
14.6	VOLNTR_HRS	Number, Double	120	Voluntary worker time applied to a zone
14.7	HRS_WORKED	Number, Double	50	Project hours applied to a zone

Figure 2: Weed Management Zone Officer collecting gamba grass data

4. FIELD ASSESSMENT OF WEED INFESTATIONS

Every valid weed record must have <u>all</u> of the core attributes recorded. Each record must identify the person or organisation taking the record, as well as the details explained below. The recommended attributes are encouraged as they allow the weed record to remain useful over time by providing a picture of the infestation at the time of recording and how it changes over time.

The following is a guide to efficiently evaluating and recording a weed site in the field.

How to record weed area as a point record

1. Record the species.

When a weed is sighted, move to the area and confirm identification of the weed.

If you cannot positively identify the weed record it as "Unknown weed" and take a sample or photograph, do not try to guess. If more than one weed species is present then repeat the process with separate records for each species.

2. Assess the size of the weed patch.

Look across the area of weeds to the furthest weed plant and decide the diameter.

Decide if the area is best fits in a circle of either 20, 50 or 100 metres. If it is a single plant or small patch you would choose 20 metres. The size 100 metres extends about as far as you can see on the ground, if the weeds extend out of sight you will need to make another point further on. You may place overlapping circle areas to reflect different densities.

3. Assess the density of weeds within the circle.

Decide how much of the area is covered by weeds.

Assign a score from 2 to 5 based on the percentage table below. It will be useful (if possible) to move into the centre of the weed circle. Consider the whole circle size chosen in step 2 deciding on the density score. Area covered should be determined by a 'projected canopy' method.

> **Density categories**
>
> 1 = Absent, no weeds of this species in this area.
> 2 = < 1%, Very few, not many weeds eg: single plant, perhaps with seedlings.
> 3 = 1 -10%, More than one or two isolated plants but not a lot eg: a few small plants.
> 4 = 11-50%, A lot, up to half the area covered eg: a tree, dense patches of weeds.
> 5 = > 50%, Dominant cover is weed, more than half covered eg: thickets, monocultures.

4. Record the location.

Take the GPS location (ideally) from the centre of the circle.

If weed seeds may be spread or it is difficult to access the centre it is acceptable to take the reading from the location as close to the centre as practical.

5. Record the treatment.

Record the method you apply a treatment to the weeds, or record 'No Treatment'.

Choose from the list of treatment methods

> i.e: No treatment, Unknown, Treated, Foliar spray etc.

How to record weed area as a line (polyline) record

1. Record the species.

When a weed is sighted, move to the area and confirm identification of the weed.

If you cannot positively identify the weed record it as "Unknown weed" and take a sample or photograph, do not try to guess. If more than one weed species is present then repeat the process with separate records for each species.

2. Assess the 'best fit' width in metres of the linear weed area.

Look along the area of weeds to the furthest weed plant and decide a width that best sums up the width of the infestation from values of 5, 20, 50 or 100 metres. If the width is too variable you may need to make more than one line or consider recording as points or as a polygon.

3. Assess the density of weeds within the line.

For the area of the line, being from start to finish at the designated width, decide the area covered by weeds.

Assign a score from 2 to 5 based on the percentage table below. Consider the whole line area when deciding on the density score. Area covered should be determined by a 'projected canopy' method.

Density categories

1 = Absent, no weeds of this species in this area.
2 = < 1%, Very few, not many weeds eg: single plant, perhaps with seedlings.
3 = 1 -10%, More than one or two isolated plants but not a lot eg: a few small plants.
4 = 11-50%, A lot, up to half the area covered eg: a tree, dense patches of weeds.
5 = > 50%, Dominant cover is weed, more than half covered eg: thickets, monocultures.

4. Record the location.

Start the GPS track, or line sketch from one end of the linear weed area.

Walk or sketch a line as best fit through the middle of the linear weed area and finish at the end point.

5. Record the treatment.

Record the method you apply a treatment to the weeds, or record 'No Treatment'.

Choose from the list of treatment methods

ie: No treatment, Unknown, Treated, Foliar spray etc.

How to record weed area as a polygon record

1. Record the species.

When a weed is sighted, move to the area and confirm identification of the weed.

If you cannot positively identify the weed record it as "Unknown weed" and take a sample or photograph, do not try to guess. If more than one weed species is present then repeat the process with separate records for each species.

2. Assess the extent of the weed area an ensure it can be practically enclosed.

Polygons are good for clearly delineated areas of weeds, you should be able to walk around the edge of the weed area with confidence. Ensure the defined area of weed at a similar density can be delineated before attempting to create the area, you may need more than one polygon. If the area is poorly defined then the point method may be a more useful.

3. Assess the density of weeds within the polygon.

Assess the area covered by weeds for density, you may need to move to several vantage points to get a clear picture.

Assign a score from 2 to 5 based on the percentage table below. Consider the whole area within the polygon when deciding on the density score. Area covered should be determined by a 'projected canopy' method.

Density categories

1 = Absent, no weeds of this species in this area.
2 = < 1%, Very few, not many weeds eg: single plant, perhaps with seedlings.
3 = 1 -10%, More than one or two isolated plants but not a lot eg: a few small plants.
4 = 11-50%, A lot, up to half the area covered eg: a tree, dense patches of weeds.
5 = > 50%, Dominant cover is weed, more than half covered eg: thickets, monocultures.

4. Record the location.

Start the GPS track, or polygon sketch from one point of the polygon weed area. It is useful to start from a landmark or flagging tape.

Create the polygon edge line by walk a path or sketching along the outer edge of the weed area until you return to the start point. If using a GPS track to create the polygon ensure that you cross your start point so as to close the polygon.

5. Record the treatment.

Record the method you apply a treatment to the weeds in the area, or record 'No Treatment'.

Choose from the list of treatment methods

   ie: No treatment, Unknown, Treated, Foliar spray etc.

DEPARTMENT OF LAND RESOURCE MANAGEMENT

Weed Data Collection
A FIELD GUIDE FOR COLLECTING WEED DATA FOR THE NT

Land managers and on-ground workers such as contractors, farmers, stockmen and rangers are often best placed to collect information about weeds.

This Field Guide provides a user-friendly step by step guide about the weed data collection process. Detailed information is provided in the NT Weed Data Collection Manual intended for data managers, researchers and land management agencies.

The Weed Management Branch (WMB) is seeking co-operation from all stakeholders to use the standards outlined in this guide for weed data collection.

Why collect weed data?

Consistent and reliable weed data is critical for effective weed management. Land managers can use data about the type of weeds, where the weeds are found, and the extent of the infestation to help prioritise on-ground actions.

How do I collect useful data?

- Data needs to include the characteristics (attributes) of the weed AND where the weed is.
- This guide describes the information which needs to be collected and recorded, and tools to do this.
- A common tool in the Northern Territory is a *Weed Data Collection Pocket Book* ('little white book' available from the WMB) paired with a GPS.
- *If you don't own a GPS*, you are still able to collect valuable weed information. Paper maps or internet web mapping applications can be marked to show where weeds are present.
- A range of digital mapping devices such as tablets and ipads can also be used.
- Whichever tool is used, the attributes required remain the same.

NORTHERN TERRITORY GOVERNMENT
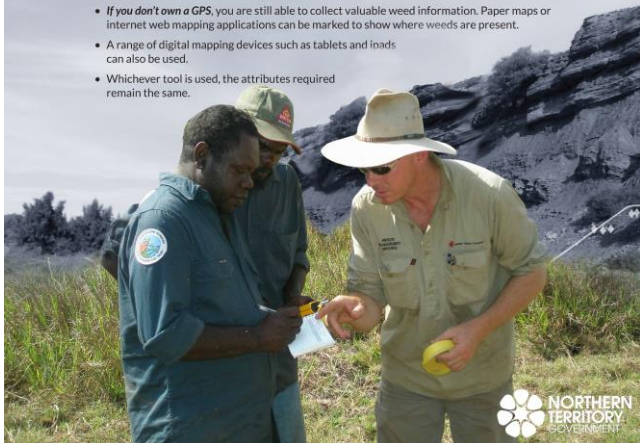
STEP 1
Preparation
Before heading into the field

How will you collect the data? Tools include:

Manual Data Entry with a GPS

Weed data is recorded manually into a data collection sheet, usually a *Weed Data Collection Pocket Book*. The corresponding location is recorded with a hand-held GPS.

This will be the main method illustrated in this guide.

You will need: *Weed Data Collection Pocket Book*, pen/pencil, hand-held GPS (spare batteries)

Manual Data Entry without a GPS

Weed data is marked on a hard copy of a map or an image from a web mapping application (eg Google Earth or NRMaps, a free web mapping application, see nrmaps.nt.gov.au)

You will need: data collection sheets, pen/pencil, copy of map or image

Digital GIS Data Entry

Electronic recorders eg tablets / ipads / palm tops containing a GPS are programmed to record weed data, and to automatically log the location.

You will need: Electronic device with weed data collection software installed

What else might you need?
- site information (eg. how to get to a specific site)
- copies of maps or images (paper or electronic)
- any existing data uploaded into your GPS (eg. track files, previous monitoring points, photos)
- spare tools and equipment (eg. batteries, data sheets, ID books, camera)

STEP 2
Data Collection
In the field

Characteristics of the weeds, called data attributes, are collected and entered. A weed infestation is usually given a single data point, and a unique data record identifier (eg. GPS waypoint number). Ensure your GPS is set to Map Datum GDA94.

- Mark the point on the GPS (or on your paper map or image if you don't have a GPS).
- Record the GPS waypoint number (or identifying number from map), onto your *Weed Data Collection Pocket Book*, then
- Write down the corresponding attributes of the weed infestation, as described below:

Core attributes to be recorded:

These are the essential minimum requirements necessary to ensure a reliable and consistent weed record.

Who collected the data

Where was the data collected (GPS coordinates, or marker on a map)

Name of the weed

When was the data recorded

Size (does the infestation fit within 20, 50, or 100m diameter)

Density (1-5) of weed within that area (= the amount of groundcover that is weeds as a proportion of the total ground cover)
1= Absent, no weeds
2 = <1%, very few, maybe a single plant
3 = 1-10%, a few small clumps
4 = 11-50%, a lot, up to half the area covered
5 = >50%, weed is the dominant cover

What treatment method if any, was used: eg. foliar spray

Recommended attributes include:
- Growth stages (seedlings, juveniles or adults)
- Specific project, site or herbicide details (eg glyphosate 360/Round-Up®)

Optional attributes include:
- Soil or Vegetation characteristics
- Operational factors (additional herbicide details)
- Biological control

STEP 3
Data Processing
Back in the office

The weed data consisting of *where* the weed was found AND the *attributes* of the weed, needs to be organised into a useful format.

Where was the weed?

Data needs to show the location (latitude and longitude) of the weed, along with its identifying number.

This is downloaded from the GPS and/or electronic recorder using specific software depending on land managers' requirements. Downloaded data is commonly saved as ESRI shape files (.shp) and manipulated in ArcGIS®. This is the preferred Weed Management Branch file format.

Paper or electronic maps showing the location of your weed record can be saved as images or web-links (eg. Google Earth or NRMaps).

What were the weed characteristics?

Location (latitude, longitude) of the weed needs to be matched with the corresponding weed ATTRIBUTES which you have collected in your *Weed Data Collection Pocket Book* or sheet.

Copy your weed attributes from your *Weed Data Collection Pocket Book* into an Excel spreadsheet (available from the WMB), ensuring these match the appropriate weed point data.

Preferably, copy and insert the latitude and longitude data from your downloaded GPS so that all necessary data is combined in one spreadsheet.

Ideally, provide the Weed Management Branch with this spreadsheet with all weed ATTRIBUTES; also send, the GPS data file or the map image for the LOCATION of the weed.

STEP 4
Using your data
From the office to the field

The most useful way to look at weed data is on a map, which can then inform your efforts in managing weeds:
- distinguish between core and isolated infestations: keep 'clean areas clean' by treating isolated weed infestations
- identify key management areas, such as creek lines infesting downstream areas
- categorise critical control areas, such as habitats with high biodiversity significance
- prioritise resource allocation – personnel, herbicide, on-ground equipment
- determine success of previous treatments, to decide on most effective future control
- inform machinery movement and hygiene practices: weeds along tracks should be treated to prevent vehicles spreading weeds further

You can create your own map using a web application (eg Google Earth), or using NRMaps (http://www.lrm.nt.gov.au/spatial-lrm/nrmapsnt), or request assistance through the Weed Management Branch.

NR MAPS

Knowing WHERE your weeds are, helps you decide HOW you need to manage them.

This brochure is intended as a field guide; more resources and advice are available from the Weed Management Branch, including NT Weed Data Collection Manual, How to Download my Garmin GPS, templates of Excel Spreadsheets and spatial data requests.

Email: Weedinfo@nt.gov.au
Ph: 8999 4567

Northern Territory Government

Weed data collection pocket book

Please refer to *NT Weed Data Collection Manual* for full attribute details.

Contact: Weed Management Branch
Web: www.nt.gov.au/weeds
Email: weedinfo@nt.gov.au
Phone: (08) 8999 4567 Fax: (08) 8999 4445

Set the MAP DATUM on your GPS to WGS84 or GDA94
The preferred coordinate system to use is decimal degrees (d.ddddd)

www.nt.gov.au/weeds

Treatment method
Control method applied today as per below.
If none, record 'No treatment'

- Foliar spray
- Residual application
- Basal bark
- Cut stump
- Stem injection
- Aerial spray
- Slashed or cut
- Hand pull

Herbicide	The active ingredient(s) of the herbicide applied today (if any)
GPS waypt	Waypoint ID as entered in the GPS
Weed name	Common name or scientific name for the weed recorded
S (y/n)	Seedlings: Are seedlings visible?
J (y/n)	Juveniles: Are juvenile plants visible?
A (y/n)	Adults: Are there adult plants, or seeds, or evidence of past seeding present?
Seed (y/n)	Seeds: Are seeds visible today? Or plants with seeds or pods?
Treat (y/n)	Treatment: Did you apply treatment to this site?
Comment	Record any notes for yourself here.

Size dia m Size/diameter of the area you are recording information about (in metres). Use 20m, 50m or 100m.
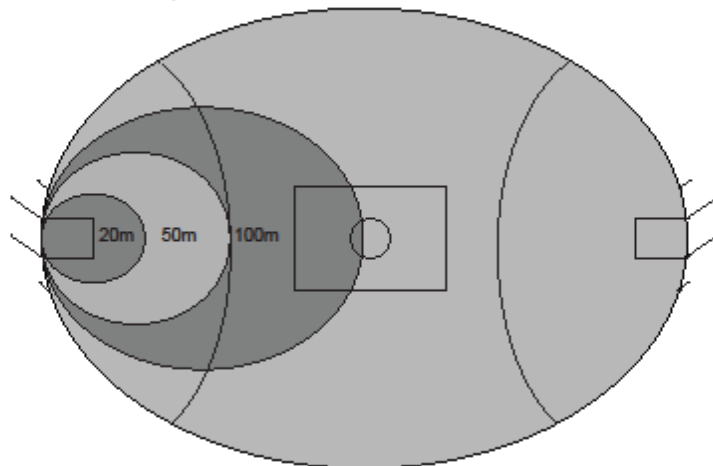
Example of size/diameter compared to a football oval. (Sizes 20m, 50m, 100m)

Dens cat Density of weeds in the assessed area using categories described below

1 = No weeds (absent)		2 = Single plant or very few (<1%)	3 = A few plants (1-10%)
4 = Many weeds, up to half (11 – 50%)	5 = Mostly weeds, more than 50%		6 = Density not assessed

Density category (Dens cat) examples

Absent (None) None	Less than 1% Little bit	1 -10% Bit more, not big mob	11-50% Big mob	More than 50% Biggest mobs

Recorder (name)		GPS		Location or project					
Treatment method		Herbicide						Date	
GPS waypt	Weed name	Size dia M	Dens cat	S y/n	J y/n	A y/n	Seed y/n	Treat y/n	Comment

Data entry sheet for booklet – example

Note : Digital versions of these spreadsheets are available from the Weed Management Branch

RECORDER		Fred Smith		Location or Project Name:							
ORGANISATION NAME		Weed Terminators NT		Recorder Method						eg. High precision GPS	
your reference	eg. 2/11/2006	Set the Datum on your GPS receiver to WGS84 or GDA94 **using decimal degrees Lat: -14.56341 Long: 132.34521**	Common name	5, 20, 50, 100, 200	1,2,3,4,5	use list	Yes, No, Not recorded			use list	use list
WAYPOINT (SITE_ID)	DATE_REC	LAT_G94	LONG_G94	WEED_NAME	SIZE_DIA_M	DENS_CAT	TREATMENT	SEEDLINGS	JUVENILES	ADULTS	HERBICIDE	SEED_PRES	COMMENTS
006	13/08/2015	132.31142	-14.51862	Athel Pine	5	2	Stem injection	No	No	Yes	Triclopyr 600g/L	Not recorded	Example only

Data entry sheet for with every attribute – example

Note : Digital versions of these spreadsheets are available from the Weed Management Branch

CORE ATTRIBUTES															
ID	SITE_ID	SITE_MON	WEED_NAME	GENUS_SPP	DATE_REC	LAT_G94	LONG_G94	RECORDER	ORG_NAME	SIZE_DIA_M	WIDTH_M	SIZE_M2	DENS_CAT	TREATMENT	REC_METHOD
										Point only	Line only	Polygon only			
0	wp67		Athel pine	Tamarix aphylla	18/03/2005	-24.94089	133.20390	Chris Brown	Weed Management Branch	20			2	Treated	Single GPS
1	wp68	Finke_01	Athel pine	Tamarix aphylla	18/03/2005	-24.94942	133.21612	Chris Brown	Weed Management Branch	20			2	Treated	Single GPS
2			Mimosa	Mimosa pigra	23/10/2012	-14.45653	135.26344	Brad Sauer	Weed Management Branch	50			3	Basal bark	Single GPS
3			Bellyache bush	Jatropha gossypiifolia	20/01/2012	-14.97664	133.07750	Ian Rowbottom	Roper River Landcare Group	20			4	Foliar spray	Single GPS

RECOMMENDED ATTRIBUTES								
PROJECT	SEEDLINGS	JUVENILES	ADULTS	SEED_PRES	PAST_TREAT	HERBICIDE	YEAR	COMMENTS
	Yes	Yes	Yes	Yes	NR	Tricloypyr and Picloram	2012	Follow-up inspection required
	Yes	Yes	Yes	Yes	NR	Tricloypyr and Picloram	2012	Follow-up inspection required
NRM 2010-075	No	No	Yes	Yes	NR	Tricloypyr and Picloram	2012	Follow-up inspection required
Mangarrayi Rangers and NTRM00053	Yes	Yes	No	No	No	Metsulfuron-methyl	2012	

OPTIONAL ATTRIBUTES																				
PLOT_LEN	PLOT_WIDTH	STEM_COUNT	TREAT_MON	SITE_COND	SOIL_DIST	VEG_DIST	SURFACTANT	CHEM_TRADE	CHEM_CONC	ADJUVANTS	PENETRANTS	TRANSPORT	EQUIPMENT	LOCALITY	AREA_NAME	ZONE_NAME	AGENT	AGENT_CNT	AGENT_PRES
								Access											
								Access											
								Access											
								Brush-off											

DIRECTOR
Weed Management Branch
Rangelands Division
Department of Land Resource Management
Northern Territory Government
Phone   (08) 8999 4567
Facsimile   (08) 8999 4445

Website   www.nt.gov.au/weeds
Email   weedinfo@nt.gov.au

DARWIN REGION

3rd Floor Goyder Building
Chung Wah Terrace
Palmerston NT 0831
Phone   (08) 8999 4567
Facsimile   (08) 8999 4445

KATHERINE REGION

32 Giles Street, Katherine
Katherine NT 0851
Phone   (08) 8973 8107
Facsimile   (08) 8973 8122

TENNANT CREEK REGION

33 Leichhardt Street
Tennant Creek NT 0860
Phone   (08) 8962 4314
Facsimile   (08) 8962 2651

ALICE SPRINGS REGION

Arid Zone Research Institute
Alice Springs NT 0870
Phone   (08) 8951 9210
Facsimile   (08) 8957 9222

SPATIAL DATA AND MAPPING

Weed Management Branch
Rangelands Division
Department of Land Resource Management
Northern Territory Government
Phone   (08) 8999 4452
Facsimile   (08) 8999 4445