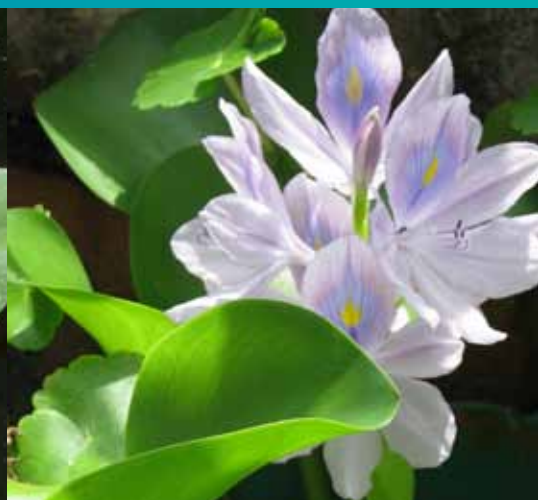


Recognising **Water Weeds**

EARLY DETECTION SURVEY GUIDELINES
FOR WEED PROFESSIONALS



WeedED Resource



Industry &
Investment

Recognising Water Weeds Early Detection Survey Guidelines for Weed Professionals

A method of prioritising and surveying waterways for the early detection of water weeds

Written by Jessica Grantley, Fiona McPherson, Phil Moran and Andrew Petroseshevsky,

Edited by Matthew Stevens and Elissa van Oosterhout

A VET sector resource:

- AHC2803A Observe and report plants and/or animals
- Enquiries: NSW Department of Primary Industries, Grafton Primary Industries Institute, PMB 2, Grafton, NSW 2460.

Weeds Hotline 1800 680 244 or weeds@dpi.nsw.gov.au

© The State of New South Wales Industry & Investment NSW 2009

Information contained in this publication may be copied or reproduced for study, research, information or education purposes, subject to inclusion of an acknowledgement of the source. In particular, the user of this publication agrees to include this copyright notice in any copy made.

The products described in this document are used as examples only and the inclusion or exclusion of any product does not represent any endorsement of manufacturers or their products by Industry & Investment NSW. Industry & Investment NSW accepts no responsibility for any information provided in this material. Any questions that users have about particular products or services regarding the subject of this material should be directed to the relevant commercial organisation.

Disclaimer

This document has been prepared by the authors for Industry & Investment NSW for and on behalf of the State of New South Wales, in good faith on the basis of available information. While the information contained in the document has been formulated with all due care, the users of the document must obtain their own advice and conduct their own investigations and assessments of any proposals they are considering, in the light of their own individual circumstances. The document is made available on the understanding that the State of New South Wales, the author and the publisher, their respective servants and agents accept no responsibility for any person, acting on, or relying on any opinion, advice, representation, statement or information whether expressed or implied in the document, and disclaim all liability for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on the information contained in the document or by reason of any error, omission, defect or misstatement (whether such error, omission, defect or misstatement is caused by or arises from negligence, lack of care or otherwise). While the information is considered true and correct at the date of publication, changes in circumstances after the time of publication may alter the accuracy of the information. The information

may change without notice and the State of New South Wales, the author and the publisher, and their respective servants and agents are not in any way liable for the accuracy of any information contained in this document. The product trade names in this publication are supplied on the understanding that no preference between equivalent products is intended and that the inclusion of a product name does not imply endorsement by Industry & Investment NSW over any equivalent product from another manufacturer. Recognising that some of the information is provided by third parties, the State of New South Wales, the author and the publisher take no responsibility for the accuracy, currency, reliability and correctness of any information included in the document provided by third parties.

Privacy and personal information Act 1998

CB Alexander Agricultural College, Tocal, complies with the Privacy and Personal Information Act 1998.

WeedED training and information resources were originally produced by the Cooperative Research Centre for Australian Weed Management. WeedED resources are now produced and managed by the NSW Weeds Training Program, supported by Industry and Investment NSW, Noxious Weed Grants and the Registered Training Organisation Tocal College. WeedED resources are suitable for Weeds Officers, Project Officers and Natural Resource Managers as well as others involved in operational, managerial or community-based weed management. WeedED information resources won the 2006 CRC Association Award for Excellence in the category of Innovation in Education and Training and Public Outreach Activities.

Early Detection Survey Guidelines for Weed Professionals

The water weed threat

Highly invasive water weeds pose a serious threat to Australia's waterways, which are vital resources for industry, biodiversity and recreation. Water weeds can form dense floating mats and underwater growth that can smother and choke a waterway. They place a burden on Australia's economy by blocking irrigation and water supply infrastructure, reducing the quantity and quality of agricultural products, and contributing to the high cost of weed control and management. The effect on the environment is devastating, with displacement of native flora and fauna, reduction of water quality, and increased potential for flooding and erosion. Water weeds are detrimental to the community's enjoyment of waterways and pose a serious safety hazard to swimmers and boats. Controlling water weed infestations poses a major challenge owing to the plants' aquatic habit and rapid growth rates. For example, some water weeds, such as salvinia (*Salvinia molesta*), can double their mass in 4 days in ideal conditions.

Early detection and rapid response

Early detection and rapid response offer the most strategic and cost-effective form of water weed management. Early detection of water weeds increases the likelihood of successful control and reduces costs by allowing an infestation to be treated while it is still small. Failure to detect water weed infestations early severely limits our ability to implement effective control.

The Recognising Water Weeds training resources aim to increase the adoption of early detection and rapid response protocols for water weeds, including the aquatic Weeds of National Significance (WoNS) and other high-priority water weeds throughout Australia. The resources can improve the capacity of weed control authorities to identify waterways where water weeds may be introduced, and to implement routine surveys of these sites.

Risk assessment and survey

The objective of these Guidelines is to help weed professionals identify and regularly inspect sites where water weeds may be introduced or could grow. The Guidelines offer a systematic approach to enable:

- the early detection of water weeds, facilitating immediate treatment, increasing the likelihood of successful containment or eradication and reducing long-term costs
- the identification of sites at risk of infestation by water weeds
- the prioritisation of water weed threats and the management actions needed to reduce them.

Who can use the Early Detection Survey Guidelines?

These Guidelines are designed to be used by weed officers, natural resource management staff and volunteers who are trained in water weed identification or have relevant knowledge of water weeds.

Summary of methods

The Guidelines have three parts:

Part 1: Risk assessment – an office-based review to identify and prioritise potential infestation sites.

Part 2: Survey – a systematic field inspection of high-priority sites.

Part 3: Data management and reporting.

Flow chart of early detection survey guidelines for weed professionals

Risk assessment

Office-based identification and prioritisation of sites at risk of water weed introduction and growth



Survey

Field inspection of priority water weed sites and collection of data



Data management and reporting

1. Risk assessment

The risk assessment is conducted in the office to determine which sites in your area are at risk of water weed infestation.

Step 1 – Get to know your area

Familiarise yourself with the area to gain an understanding of the catchments, and identify areas where weeds can be introduced such as waterways, roads, parks and bridges. Useful resources include topographic maps, road maps and air photos.

Step 2 – Learn to identify water weeds

The Recognising Water Weeds training resources include a Plant Identification Guide and a workshop presentation aimed at increasing water weed identification skills. Other resources include WEEDeck (order form available at <http://www.sainty.com.au>), and information sheets and brochures (particularly for aquatic WoNS) from local authorities and state or territory agencies.

Step 3 – Determine which water weeds pose a threat

Consult experts to determine which water weeds pose the greatest threat to your area. All people conducting the survey should be familiar with the water weeds that pose the greatest threats. Identify the weeds' declaration status and the control requirements and objectives for noxious weed classes within your own state or territory.

Step 4 – Collate information about previous water weed actions in your area

Find out whether previous water weed inspections have been conducted in your area. It could be useful to use existing survey sites to enable the comparison of results, and to include new sites. Contact local water weed or flora experts; they can provide assistance with site location and species identification.

Step 5 – Decide how many sites you can survey

Determine how many days you can allocate to field inspections each year (allowing for repeat inspections). The surveying of potential sites can be easily incorporated into existing weed inspection activities.

Step 6 – Identify sites where water weeds could be introduced into waterways

Although floods, wildlife and water flows contribute to the spread of water weeds throughout Australia, the most common means of water weed introduction is through human activity, both intentionally and unintentionally. Many water weeds reproduce from small fragments that can easily become stuck in boat trailers, fishing gear, earthmoving vehicles and other equipment used in or near waterways. Water weeds spread when people move this equipment from one waterway to another.

Vectors and activities capable of spreading water weeds include:

- boats, boat trailers and recreational water craft
- deliberate plantings by aquarium plant enthusiasts
- eel trapping equipment
- fishing nets
- dumping of aquarium or fishpond plants
- water movement through irrigation channels
- irrigation equipment
- water movement during floods
- slashers
- livestock (cattle, horses)
- earthmoving equipment (e.g. excavators)
- wildlife (birds, mammals etc.)
- contaminated landscaping supplies (mulch, soil, gravel)
- incorrect disposal
- mistakenly growing weeds as a garden vegetable (e.g. alligator weed)
- cropping (turf production and distribution)

It is important to identify sites where these vectors can easily gain access to waterways and record these in the site list (page 8). Potential introduction sites include:

- bridge crossings
- water bodies close to major roads
- public parks adjacent to water bodies
- boat ramps
- streams or wet areas where earthmoving activities have recently occurred
- water bodies in urban areas
- water storages.

Step 7 – Identify sites at risk of water weed growth

Water weeds grow well in waterways that:

- have areas of slow-moving water (can be seasonal)
- have permanent water
- lack native riparian vegetation
- are degraded and have high nutrient levels
- are predominantly fresh water.

These potential water weed sites also need to be recorded on the site list.

The types of water bodies where water weeds commonly grow include:

- streams, creeks, rivers
- lakes
- wetlands
- farm dams
- stormwater retention ponds
- irrigation channels
- canal estates
- urban drains
- irrigated crops (e.g. rice and turf)
- water storages.

Step 8 – Prioritise sites

The identified sites require prioritisation on the site list. Use the matrix below to help determine whether the site is at high, medium or low risk. Sites with low or medium risk are useful to include if there are significant environmental, economic or social assets downstream.

Matrix for prioritising survey sites based on level of risk

		INCREASING RISK OF INTRODUCTION (vector access) →		
		Limited vector access	Moderate vector access (bridges, parks, boat ramps)	High vector access (bridges, parks, boat ramps)
INCREASING RISK OF GROWTH (waterway characteristics) ↓	Fast flowing; few if any ponded areas; riparian cover	low risk	low risk	medium risk
	Slow moving & ponded; moderately degraded; partial riparian cover	low risk	medium risk	high risk
	Slow moving & ponded; highly degraded; limited riparian cover; high nutrient loads	medium risk	high risk	high risk

Step 9 – Determine when to survey the sites

Survey sites when plants are easiest to detect and conditions are safe for survey participants.

Water weeds are easiest to detect when they are flowering or increasing in number, usually during the warmer months, between November and February.

You must seek approval from the landholder to visit sites on private land.

The safety of those surveying sites is of utmost importance. Do not survey during heavy rain, flood or other dangerous conditions.

Suggestions

- Plot your proposed sites onto a map or in a geographic information system (GIS).
- Review your site list to ensure that it has adequate coverage and is practical.
- Identify a practical number of sites that can be inspected and monitored each year.
- Remember that the survey can be completed over a series of weeks or months.

2. Survey

The survey involves a field inspection and the onsite collection and recording of data from the sites identified in the site list.

Equipment required

- Survey datasheets
- Clipboard
- Pen or pencil
- Camera (preferably digital)
- Water weed identification resources
- Labelled plastic bags for plant collection
- Hat, sunscreen, insect repellent, boots
- Binoculars
- GPS receiver (optional)
- Hand lens.

Ensure that you are familiar with the workings of all equipment and that it is in working order.

How to look for water weeds

Before you begin, become familiar with your organisation's policy on conducting inspections or surveys in the field.

Assess each site for ease of access and take care when conducting the survey to minimise site disturbance.

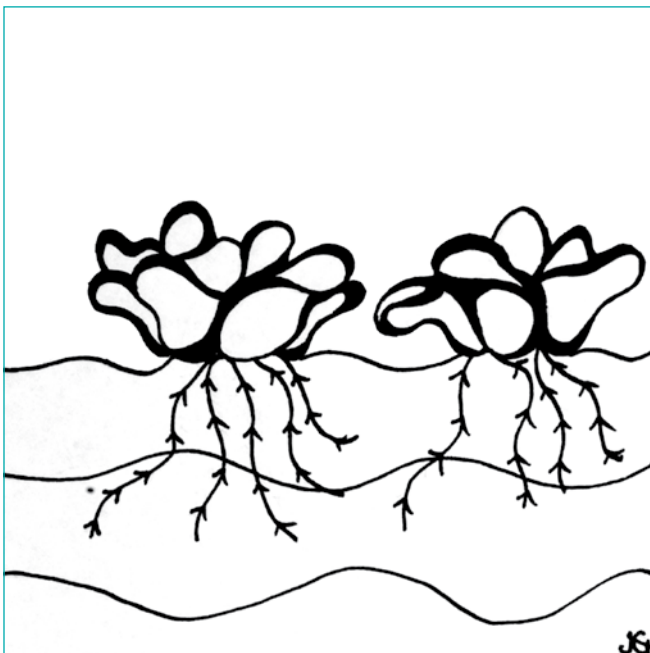
Water weeds can be difficult to see and are often seen only on close inspection. At each site it is important to walk and observe all the accessible areas adjacent to the waterways. In some situations it may be possible to survey an extensive area; however, in most circumstances a 25-m radius is sufficient. Structures such as bridge crossings will allow you to inspect the middle of the water body. It is

important to check around logs, fences and other snags where water weeds may have been trapped during flooding. Closely examine the waterways and banks for the different categories of water weeds:

Floating weeds (e.g. salvinia) – Check the water surface, near the bank and amongst other vegetation. Binoculars may be useful.

Submerged weeds (e.g. cabomba) – Close inspection is required, as submerged plants may not be obvious from a distance. You may need to use a stick or scoop to get plants out of the water.

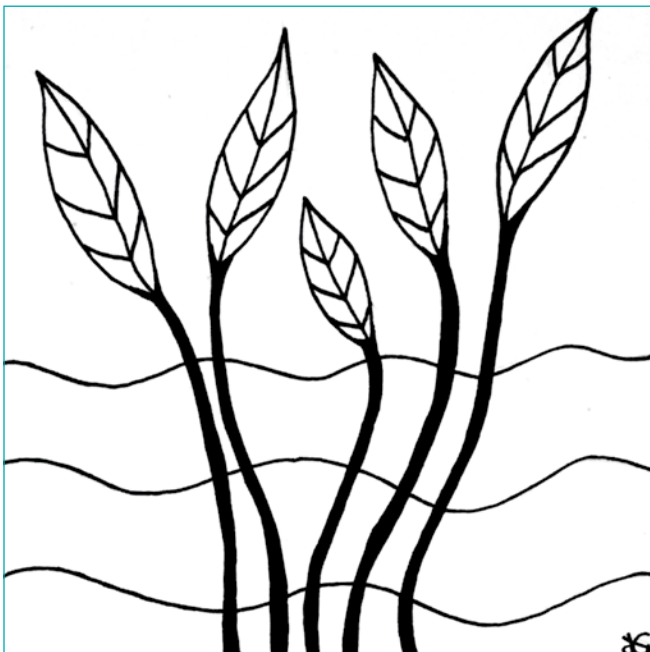
Emergent weeds (e.g. alligator weed) – May occur as clumps growing on the bank or in water near the bank, or can be individual plants growing amongst other vegetation along the bank.



Floating weeds



Submerged weeds



Emergent weeds

What to do when you find a water weed

Check the key plant identification characteristics using the weed identification resources.

To determine the extent of the infestation, continue to survey upstream. This could be a swamp, impoundment or farm dam which may join the waterway only in times of high flow. Identify any additional survey sites upstream of the infestation (a boat may be useful for this).

Photograph the weed. If identification is required, take multiple shots of the plant and capture leaf arrangement, flowers, stem, leaf margin, root system etc.

Collect a complete plant specimen that has the key identification features intact, including the flowers, leaves, stem and roots.

If formal identification is required, you can send a specimen to your state or territory herbarium. Contact details and requirements for specimen preparation are provided in the Participant Workbook, along with instructions on preparing plant specimens. Label the specimen with your name, the collection site and date collected. Complete a herbarium identification form (available from your state or territory herbarium) and mail the specimen and form to the herbarium.

It is an offence in most states and territories to remove noxious plants from a waterway without a permit. A permit may be obtained from the authority that administers noxious weeds legislation in your state or territory. Permits to transport a noxious weed are also required.

However, if the plant is being collected for the single purpose of seeking positive identification, responsible removal from the waterway is justifiable.

The survey datasheet

It is important to complete a survey datasheet (page 9) for each survey site. If water weeds are not found at a site, a datasheet still needs to be completed. It is important to collect high-quality data. Fields marked with an asterisk are essential to ensure that consistent and reliable information is collected.

Latitude and longitude of site: Use degrees, minutes and seconds. If a terrestrial alligator weed infestation is detected, use a GPS receiver or mud map to identify its perimeter. Use the GDA94 / WGS84 GPS datum.

Length of water body surveyed: If water weeds are discovered, then survey at least 100 m of the waterway (50 m upstream and 50 m downstream of the infestation site).

Waterway description: Circle the label that best fits the characteristics of the waterway.

Site facilities/structures: List any built structures or modifications that are present at the site. This information can assist in determining the source of the infestation.

Depth: Indicate the approximate water depth if the bottom is visible.

Substrate: Describe the dominant type of substrate (sandy, silty, rocky etc).

Species: Use scientific name (genus, species) and accepted common name.

Habitat: Record where the plant is growing in the waterway (floating, submerged, emergent or semi-terrestrial).

Area: Indicate the approximate area the water weed covers and whether the weed occurs on either bank.

Percentage cover: Estimate the percentage of the water body affected by the water weed.

Growth stage: Record whether the plant is in its juvenile or mature growth form.

Treatments: Record past treatments used at the site for that species. If a biological control agent has been used, check whether it is still present.

Mud map: If you cannot record the site location using a GPS receiver, draw a mud map on the back of the data sheet with sufficient information so that a person not familiar with the area could locate it.

3. Data management and reporting

Storing data

The location of water weeds is usually entered into a GIS in point format. If infestations are recorded as continuous for long stretches of a waterway (e.g. >200 m), data can be entered in line format.

When recording large terrestrial alligator weed infestations, or where water weed infestations occur in lakes or large rivers, data may be entered in polygon format. If this data set is to be used for state or national mapping, it may need to be converted to point format with an indication of the middle of the infestation.

If water weeds are not found at a site, all site details still need to be entered, and the site is recorded as free of water weeds.

Keep data sheets on file.

As survey sites are not randomly selected, data cannot be used to infer characteristics of areas not surveyed.

Reporting

Keep a copy of each data sheet in a central location so that the survey data can be actively managed.

Become familiar with the reporting requirements in your region. For example, I&I NSW asks that you advise it of the presence of any Notifiable Weeds found in NSW.

Site list

	Site name	Risk of introduction; access for people	Risk of establishment; waterway characteristics	Risk or priority: high, med, low
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Survey datasheet

Officer's name*: Organisation: Phone: Email:	Send a copy to:
---	-----------------

Site details

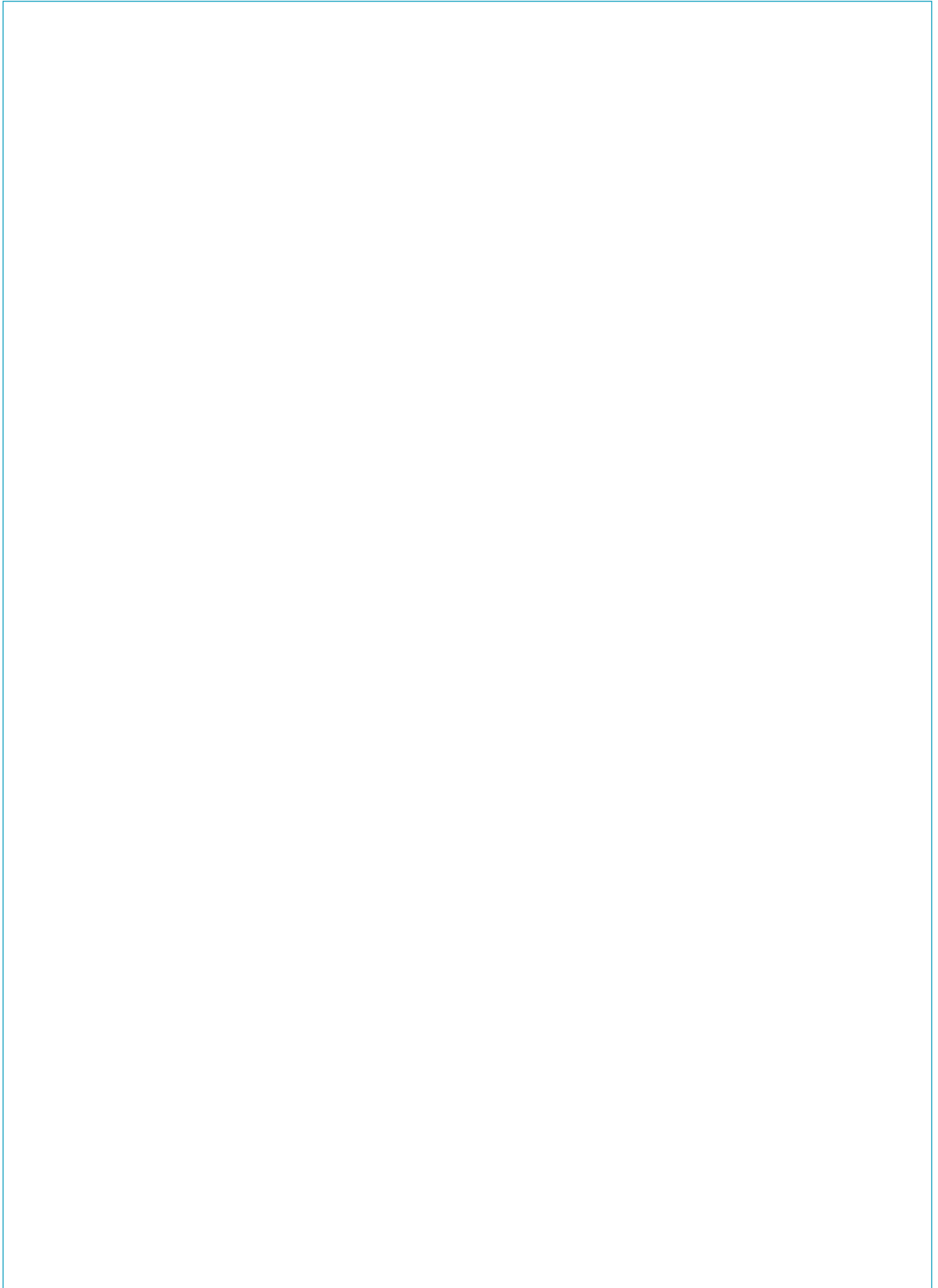
Water body:	Date:
Location:	
Latitude or northing*:	Longitude or easting*:
Length of water body surveyed:	
Waterway description: Please circle: creek lagoon river farm dam water storage dam wetland pond other:	
Site facilities/ structures: e.g. boat ramp, bridge, park, jetty	
Width (approx):	Depth (approx):
Substrate:	Flow:
Photo available? Please circle: Yes No	

Water weeds

Species*:	1.	2.	3.
Habitat:			
Area m2*:			
Percentage cover*:			
Growth stage:			
Treatments*:			
Comments*:			

*Minimum attributes to collect as per Bureau of Rural Sciences mapping standards.

Site mud map



Sample herbarium identification form

Check with your state or territory herbarium for specimen requirements.

Name:
Postal address:
Phone:
Date submitted:
Specimen or file No:

Information required: Identification only will be supplied unless otherwise requested.
--

Collection details

Collector:	Date collected:
Locality: distance and direction from nearest town	
Latitude:	Longitude:
Waterway description:	
Flower description:	
Substrate:	
Remarks:	
Herbarium response—plant identification:	
Identified by:	Date:



Resource