A guide to managing and restoring wetlands in Western Australia

Wetland management planning

In Chapter 1: **Planning for wetland management**

Version 1

Australian Government

Department of Environment and Conservation

Our environment, our future

Introduction to the guide

Western Australia's unique and diverse wetlands are rich in ecological and cultural values and form an integral part of the natural environment of the state. *A guide to managing and restoring wetlands in Western Australia* (the guide) provides information about the nature of WA's wetlands, and practical guidance on how to manage and restore them for nature conservation.

The focus of the guide is natural 'standing' wetlands that retain conservation value. Wetlands not addressed in this guide include waterways, estuaries, tidal and artificial wetlands.

The guide consists of multiple topics within five chapters. These topics are available in PDF format free of charge from the Western Australian Department of Environment and Conservation (DEC) website at www.dec.wa.gov.au/wetlandsguide.

The guide is a DEC initiative. Topics of the guide have predominantly been prepared by the department's Wetlands Section with input from reviewers and contributors from a wide range of fields and sectors. Through the guide and other initiatives, DEC seeks to assist individuals, groups and organisations to manage the state's wetlands for nature conservation.

The development of the guide has received funding from the Australian Government, the Government of Western Australia, DEC and the Department of Planning. It has received the support of the Western Australian Wetlands Coordinating Committee, the state's peak wetland conservation policy coordinating body.

For more information about the guide, including scope, purpose and target audience, please refer to the topic 'Introduction to the guide'.

DEC welcomes your feedback and suggestions on the guide. A publication feedback form is available from the DEC website at www.dec.wa.gov.au/wetlandsguide.

Contents of the guide

These topics are available in PDF format free of charge from the DEC website at www.dec.wa.gov.au/wetlandsguide.

'Wetland management planning' topic

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Some material produced by Andrew Del Marco of Ironbark Environmental been used in the preparation of this topic.

The valuable contribution of each of these people is gratefully acknowledged.

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Cover photo: courtesy of Dr Jenny Davis

Recommended reference

When referring to the guide in its entirety, the recommended reference is: Department of Environment and Conservation (2012). *A guide to managing and restoring wetlands in Western Australia*. Department of Environment and Conservation, Perth, Western Australia.

When specific reference is made to this topic, the recommended reference is: Department of Environment and Conservation (2012). 'Wetland management planning', in *A guide to managing and restoring wetlands in Western Australia*, Prepared by C Mykytiuk, Department of Environment and Conservation, Perth, Western Australia.

Disclaimer

Contents

Before you begin

Before embarking on management and restoration investigations and activities, you must consider and address the legal requirements, safety considerations, cultural issues and the complexity of the ecological processes which occur in wetlands to ensure that any proposed actions are legal, safe and appropriate. For more guidance, see the topic 'Introduction to the guide'

INTRODUCTION

This topic is intended to assist technical officers in local, state government and non-government organisations, landholders, community groups and others working in the field of wetland management and conservation to develop, implement and evaluate the effectiveness of wetland management plans. It aims to provide guidance on wetland management planning in a simple and user-friendly manner.

There are many methods for undertaking the process of management planning, each of which is slightly different and uses different terms. The process provided and the terminology utilised in this topic draws upon many widely-used methods.

Due to the variability of the situations in which management planning may occur, it is not possible to provide a detailed step-by-step methodology that will suit all situations. Instead this document will present the key steps in the process and will refer readers to other sources of information for methodologies to assist in completing these steps. In the topic the management planning processes has been broken down into four main stages (each with multiple steps). These stages are:

- Stage A: Pre-planning
- Stage B: Planning
- Stage C: Implementing
- Stage D: Evaluating and adapting.

Assumptions and limitations of this document

It is important to note that this document is for general guidance only. If you are required to undertake a management planning process or prepare a wetland management plan as a requirement or legal obligation, you must follow any guidance provided under that requirement or obligation. Please also note that the terminology used in this document differs slightly from that used in the *Guidelines checklist for preparing a wetland management plan*.[1]

Although management planning can be undertaken at a range of different scales from region to individual species, this document deals with management planning at the scale of individual wetlands. This document also assumes that the wetland has already been identified as a priority for management. Providing advice regarding prioritising management between multiple wetlands or between different assets such as wetlands and adjacent dryland vegetation is beyond the scope of this document.

Examples of prioritisation processes include:

- *Local government biodiversity planning guidelines*[2], and additional associated resources including a case study and guidance on prioritising locally significant natural areas.
- Recovery catchments with multiple wetlands, for example, see the *Buntine-Marchagee natural diversity recovery catchment recovery plan: 2007-2027* (Department of Environment and Conservation, 2008).[3]

What is management planning and why is it important?

Adaptive management: an approach that involves learning from management actions, and using that learning to improve the next stage of management[4]

Management planning is the process of setting management goals for a site and then planning, implementing and evaluating management strategies to meet these goals. It must be emphasised that it is a process and is not just about preparing a plan, although documenting information in a written plan is an essential part of the process. Successful management planning processes can be seen as an on-going cycle of plan-implement-evaluate (Figure 1). This cycle is also referred to as **adaptive management**.

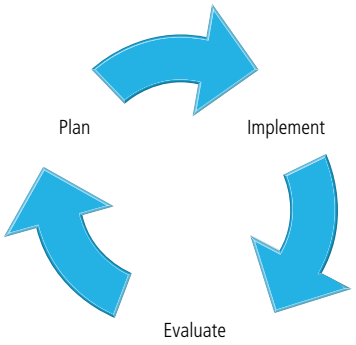


Figure 1. The adaptive management cycle; plan, implement, evaluate.

There are a number of benefits of undertaking management planning that can include:

- establishing a long-term vision and clear goals and objectives for the site to guide management
- gaining consensus amongst stakeholders on the management of the site, minimising potential for future conflict
- engaging with and working effectively with stakeholders to improve the management of the site
- ensuring that management actions undertaken will contribute to achieving the vision, goals and objectives for the site, resulting in efficient usage of time, money and human resources
- having an adequate monitoring program to enable the success or failure of management actions to be evaluation, improving future management
- maintaining effort and consistency in the management of the site and
- utilising the prepared management plan to secure funding for the site.

Principles of successful management planning

There are a number of essential principles to successful wetland management planning including:

- custom-made - as no two wetlands are the same, the management planning process and the outcomes will be unique for each wetland
- adaptive management – management is modified as conditions at the site change or new information becomes available regarding the success or failure of management strategies

- on-going **stakeholder** consultation and involvement – stakeholder consultation and involvement is an on-going process and should be initiated from an early stage in the process
- don't postpone the process until all the information is available – although as much information should be collected as possible, don't allow a lack of information to delay the management planning process, it is unlikely that all the information will ever be available. Build the collection of more information into the management planning process, where appropriate.

Stakeholder: an individual, group or institution that has an interest in or will be affected by a project's activities

Custom-made

All wetlands are unique; as such the management planning processes and outcomes of the process will be different for each wetland. Wetland management planning needs to be tailor-made for individual wetlands and it is unlikely that a management plan prepared for one wetland will be suitable for another.

Adaptive management

Adaptive management is at the heart of successful management planning. The key to adaptive management is continual evaluation of the effectiveness of management strategies and adapting them accordingly. Management strategies may be adapted if conditions at the site change or if a strategy is not achieving the outcome it was selected to achieve.

➤ For additional detail on evaluating and adapting a management plan see the section 'Stage D: Evaluating and adapting' in this topic.

On-going stakeholder consultation and involvement

There are a number of benefits of on-going stakeholder consultation and involvement in a management planning process including:

- improving the quality of the planning process and outcomes of it
- gaining new perspectives and solutions
- forming beneficial partnerships to assist in project implementation
- promoting confidence in the process
- fostering a sense of ownership amongst stakeholders
- increasing the understanding of the wetland's values
- reducing the potential for conflicts.

Stakeholders may include neighbours, nearby land managers and landowners, community groups or organisations and local and state government agencies and utility providers if there are overhead or underground services located within or adjacent to the management planning area.

It is important that stakeholder consultation and involvement is initiated as early as possible and continues throughout the management planning process.

extra information

Stakeholder consultation and involvement

For information on incorporating Aboriginal cultural heritage into a wetland management plan see:

Swan Catchment Council (2008). *Aboriginal cultural heritage management plan template 2008*[5]

For more information on stakeholder consultation and involvement see:

Community involvement framework (Department of Environment, 2003)[6]

Interim industry guide to community involvement (Department of Environment and Environmental Protection Authority, 2003)[7]

Facilitation toolkit: A practical guide for working more effectively with people and groups (Keating, Colma DM, 2003)[8]

Consulting citizens: A resources guide (Department of Premier and Cabinet Citizens and Civics Unit, 2003)[9]

Consulting citizens: Planning for success (Department of Premier and Cabinet Citizens and Civics Unit, 2003)[10]

Consulting citizens: Engaging with Aboriginal Western Australians (Department of Premier and Cabinet Citizens and Civics Unit, 2004)[11]

Don't postpone the process until all the information is available

In any management planning process, all the information will never be available. Rather than waiting for all the information to be available, which may never happen, management planning should proceed using the best available information and wherever possible expert advice to verify and add to the available information. Expert advice can be very valuable and can often be used in lieu of documented information. The collection of baseline surveys and other information can be built into the management plan.

KEY STEPS IN THE MANAGEMENT PLANNING PROCESS

The key stages and specific steps in the management planning process are outlined in Table 1 and then described in more detail in the sections below. The key stages of the process are: pre-planning, planning, implementing and lastly evaluating and adapting. Although management planning is being presented as a linear process, in practice, it may be far from linear with many steps overlapping and at the completion of some steps, previous steps may need to be revisited and revised. The process may be a relatively straightforward one or it may be complex and time consuming. The complexity of the process will depend on a number of factors including:

- the size of the site being considered
- the number of landowners and land managers
- the numbers of other stakeholders
- the complexity of the site in terms of the values to protect and the threats to address
- requirements for the plan and the level of detail stipulated in these requirements
- consultation and approvals processes.

As previously mentioned, because of the variability of the situations in which management planning may occur, it is not possible to provide a detailed step-by-step methodology that will suit all situations. Instead this document presents the key steps in the process and refers readers to other sources of information for methodologies to assist in completing these steps. Table 1 shows the key steps in the management planning process. Figure 2 shows the same steps in diagrammatic form.

Table 1. Key steps in the management planning process.

STAGE	STEP
Stage A: Pre-planning	**Step 1**: Defining the process
	Step 2: Understanding the wetland
Stage B: Planning	**Step 1**: Identifying values and developing a vision
	Step 2: Identifying key components and processes, assessing condition and setting goals
	Step 3: Identifying and ranking threats
	Step 4: Selecting management strategies and setting objectives
	Step 5: Preparing an implementation plan
Stage C: Implementing	Implementing management strategies and monitoring activities
Stage D: Evaluating and adapting	Auditing the results of the plan, and re-assessing the plan itself

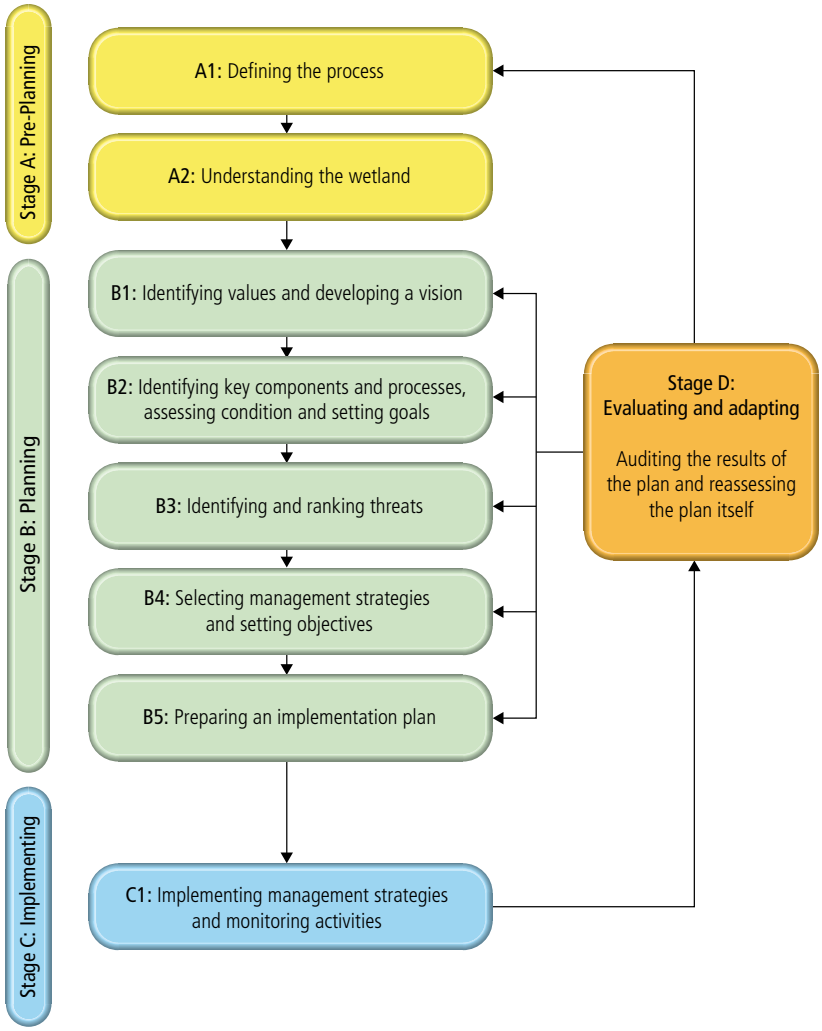


Figure 2. Key steps in the management planning process.

STAGE A: PRE-PLANNING

This is the stage at which the decision is formally made to undertake a management planning process. At this stage important decisions are made on how the planning process will proceed. It is also at this stage that information will begin to be collected to gain an understanding of the management area. Gaining this understanding is critical to being able to undertake a successful management planning process. There are two steps in the pre-planning stage:

1. defining the process
2. understanding the management area.

Step 1: Defining the process

The aim of this stage is to clarify a number of key aspects of the process including the project team, any requirements for the plan and importantly the scope of the plan in terms of the geographic area it will cover and broad timeframes for its preparation, implementation and review.

Project team

Regardless of whether the process is being undertaken by professionals or volunteers, it is important that the roles and functions of project team members are established during the early stages of project definition. There may be a number of different roles in the project team as outlined in Table 2. While a management planning process may be triggered by a third party, such as a community group, the process should ideally be managed by the owner or manager of the land. If a consultant is to going to be employed to write the plan on behalf of the owner or manager, it will be necessary to prepare and agree upon a project brief and nominate an individual as 'contract manager'. In this case a project team will be assembled by the contractor.

Table 2. Potential roles and functions of a management planning project team.

Role	Function
Project manager	Although leadership may be shared between team members, one individual should be appointed as overall leader for the project.
Core project team	A small group who are ultimately responsible for overseeing the management planning process.
Full project team	Complete group of people involved in preparing, implementing and, evaluating and adapting the management plan.
Project advisors	People not on the project team, but who may provide advice or feedback at any stage of the process.
Stakeholders	Individuals, groups, or institutions who have a vested interest in the management area and/or who will potentially be affected by the management strategies. If someone is a key stakeholder it may be appropriate to include them as a member of the project team. For more information on stakeholders see the 'On-going stakeholder consultation and involvement' section above.

Successful stakeholder partnerships

Many successful management plans have been based on a strong partnership between different stakeholder groups, including government and community organisations. Strong partnerships can be achieved by either party inviting the other to become a member of the core project team, a project advisor or stakeholder.

Such partnerships between organisations are effective as long as there is a clear understanding on roles, responsibilities and funding contributions, which can be established through a formal, written partnership agreement.

Ramsar Convention: an international treaty that focuses on the conservation of internationally important wetlands signed in Ramsar, Iran in 1971

Contextual information

It is important to identify any contextual information which will guide or inform the management planning process. Specifically, this will include any requirements for the plan as well as any other information that provides context to the plan such as regional catchment plans and previous management plans for the site.

Requirements for the plan

It will be important to identify if there are any requirements for the plan as these may influence the process and guide the contents of the plan. In particular this information will inform the scope of the plan, any requirements for consultation approvals and potentially the project team and stakeholders. There are a number of situations in which the preparation of a wetland management plan may be required through a statutory process such as a condition of development, subdivision or scheme amendment approvals. In the case of wetlands of international significance listed under the **Ramsar Convention**, the development of wetland management plans are not statutory but are a tool for achieving obligations of the international treaty.

In such situations it will be necessary to follow the relevant requirements or frameworks. For instance, for management plans developed for wetlands listed under the Ramsar Convention, it is a requirement that they describe the benefits that humans gain from that wetland, and management strategies associated with these benefits.

➤ For more information on wetland management plans required to be prepared as a condition of a development, subdivision or scheme amendment approval, or local government development application see *Guidelines checklist for preparing a wetland management plan* (Department of Environment and Conservation, 2008).[1]

➤ For more information on the preparation of wetland management plans for wetlands of international significance listed under the Ramsar Convention see:

- the Australian Government's Australian Ramsar management principles webpage: www.environment.gov.au/water/topics/wetlands/managing/aust-ramsar-management-principles.html
- Ramsar Handbook18 *Managing wetlands: Frameworks for managing wetlands of international importance and other wetland sites*[12]

Supporting information

There is a wide range of information which may provide context to the management planning process or the contents of the plan including:

- relevant international, national or state plans
- relevant regional or catchment plans
- previous versions of the plan or other management plans for the site.

➤ For more information on relevant plans contact the relevant local government, regional natural resource management organisation or local DEC office. See the topic 'Funding, training and resources' in Chapter 1 for contact details for these groups.

Scope of the plan and the process

Defining the scope of the plan and the process will assist in keeping it focused and preventing it from getting out of hand. There are a number of elements of the scope that need to be defined including:

- geographic – the physical area that the management plan will cover
- temporal – the timeframe for the planning process as well as the term of the plan itself and
- resources – the resources that are available for both the planning process implementation of the plan. Key resources include money, staff, skills and equipment.

Geographic

The management plan area typically includes the wetland(s), wetland buffer and any other adjacent areas, such as dryland vegetation, where activities will be controlled in accordance with the plan.

The buffer adjoining a wetland assists in maintaining the ecological processes associated with the wetland, and aims to protect the wetland from potential adverse impacts such as contaminated surface water flows caused by adjacent land uses. A buffer can also assist in protecting the community from potential nuisance insects, for example, midges. To maintain wetland values, it is important to determine, protect and manage an adequate buffer. If the wetland buffer is outside of the management plan area, potentially because it is under the control of a different land manager or owner, careful consideration should be given to how the plan will influence the management of the wetland buffer.

➤ For more information on wetland buffers see Chapter B4 of *Environmental guidance for planning and development*.[13] A new methodology for determining wetland buffer requirements is in preparation. Refer to the DEC website www.dec.wa.gov.au/wetlands for more information.

Areas adjacent to the buffer are often also included in wetland management plans. If not appropriately managed, land uses in these adjacent areas can change the wetland's natural water, soil and biotic regimes (e.g. grazing, parkland, housing and picnic areas).

In some instances the inclusion of numerous wetlands in one management plan may be considered. This may be a wise decision if a number of wetlands are inter-connected through surface or groundwater and hence are part of a single system. An example of this is the wetlands in the Buntine-Marchagee Catchment, the management of which has been addressed in the *Buntine-Marchagee natural diversity recovery catchment recovery plan: 2007-2027* (Department of Environment and Conservation, 2008).[3]

In some instances, the wider geographic area that the plan will seek to influence should also be defined. For example, a land development company may influence activities within the boundary of a new residential or industrial subdivision in which the wetland is located. In this instance the plan should address strategies for the new subdivisions. A farmer may choose to identify management strategies for the paddocks surrounding the wetland, or even for the entire farm.

Temporal

Preparing the plan

There are a number of factors that will potentially influence the timeframe for the preparation of a management plan, the extent of some of these factors will not be known until late in the process. As such, although a timeframe for the preparation of the plan will be set, it may need to be revised later in the process. Factors that will potentially influence the timeframe of the plan's preparation include:

- the size of the site being considered
- the number of landowners and land managers
- the numbers of other stakeholders
- the complexity of the site in terms of the values to protect and the threats to address
- requirements for the plan and the level of detail stipulated in these requirements
- consultation and approval processes
- the format of the final product, whether it be a map accompanied by a couple of pages of text or a document hundreds of pages in length.

Implementing and reviewing the plan

There is no standard length of time a plan should last for (that is, a term or timeframe). Some wetland management plans are applicable for a single year while others are for twenty or more years. The important thing to keep in mind when deciding upon a time period for a management plan is the realistic length of time that will be required for the goals of the plan to be achieved. For example, if one of the goals of a management plan is: 'By July 2019, the extent and cover of native vegetation and native plant species richness at the site is equal to or greater than levels in 1999' and the threat which needs to be mitigated to achieve this is weeds, you would expect it to take at least five years before any results are achieved.

Financial

When making the decision to undertake a management planning process and prepare, implement and, evaluated and adapt a management plan it is important to be aware of the costs involved in undertaking this process from start to finish. Potential costs involved in preparing, implementing and reviewing the management plan may include:

- employment of staff and contractors
- cost of holding meetings
- undertaking surveys of the site (flora, fauna etc)
- materials and labour for implementation.

At this early stage it is unlikely that the full cost of each stage will be known but it is important to budget for each stage and recognise early in the process any potential shortfalls in funding.

Step 2: Understanding the management area

In order to successfully manage a wetland it is essential to have an understanding of the management area including the wetland itself. The aim of this step is to begin to gain this understanding and to gather enough information to inform the subsequent steps of the management planning process including:

- identifying key values
- identifying key wetland components and wetland processes
- setting goals for the condition of key components and processes
- identifying and ranking threats
- selecting management strategies.

Table 3 provides a guide for the type of information that should be collected during this stage of the process. Importantly, this step of the process is about what is and is not known about the site. Undertaking this step towards the beginning of the management planning process will allow any knowledge gaps to be identified and addressed early. Subsequent steps in the process, including identifying values, identifying key wetland components and processes and identifying and ranking threats will enable further detail to be added to the information collected during this step.

There will be a range of sources for this information including:

- written documents including reports and plans (both published and unpublished)
- electronic databases and datasets
- expert advice
- anecdotal information
- on-ground investigations.

Although there may seem to be an infinite amount of information that can be collected at this stage of the process, the information gathered should be limited to that which is relevant to the management of the wetland(s). At this stage it can be very useful to carry out an initial, broad assessment of the management area to gather much of this information.

Table 3. Information that will assist in undertaking a management planning process.

Type of information	Examples
Administrative information	• a description of the geographic extent of the management area (as defined in Stage A, Step 1) • location, name and description of the wetland • current tenure, ownership, vesting, purpose and management arrangements, including adjacent reserves and properties • local and regional scheme zoning and land use (existing and proposed) within and adjacent to the management area • infrastructure such a fences, pathways, boardwalks and buildings (existing and proposed) within and adjacent to the management area

Type of information	Examples	
Administrative information	• wetland boundary, classification (wetland type) and, if available, the assigned wetland management category and unique feature identifier number (UFI) • natural wetland group (e.g. consanguineous suite). • recognised conservation significance of the site o representation of the wetland within an international, national, regional and local context o bioregion values (e.g. Interim Biogeographic Regionalisation for Australia; biodiversity hotspot) • requirement for the plan (e.g. WAPC subdivision condition) • subdivision and/or development plans (as identified in Stage A, Step 1) • regional, sub-regional and catchment plans which provide context for the plan (as identified in Stage A, Step 1) • legislation and government policies that apply to the management area.	
Management actions	Gather any available information on previous or current management actions that have been undertaken at the site.	
Values	At this stage it is only necessary to gather any existing information on the values of the site as the values of the site will be examined further in the next stage of the process. For additional detail and specific examples of wetland values see 'Step 1: Identifying values and developing a vision' in Stage B.	
Components & processes of the wetland	Gather any available information regarding the historic, current or predicted future state of each component and process. For additional detail and specific examples of wetland components and processes see 'Step 2 Identifying key components and processes, assessing condition and setting goals' in Stage B.	
	Components • Physical form • Wetland soils • Hydrology • Water physicochemistry • Biota (animals, plants, algae, fungi, bacteria etc)	*Process types* • Climate • Geomorphology • Hydrology • Energy and nutrient processes • Processes that maintain animal and plant populations • Species interactions • Physical processes
Threats	Gather any available information regarding the historic, current or predicted threats to the site. For additional detail and specific examples of threats see 'Step 3 Identifying and ranking threats' in Stage B.	

STAGE B: PLANNING

This is the most critical stage of the management planning process. At this stage the goals and objectives for a site are determined and the strategies for achieving these selected. It is also at this stage that methods and timeframes for the implementation and review of these strategies are decided. This stage of the management planning process can be broken down into five steps:

1. identifying values and developing a vision
2. identifying key components and processes, assessing condition and setting goals
3. identifying and ranking threats
4. selecting management strategies and setting objectives
5. action planning.

Ecosystem services: benefits that people receive or obtain from an ecosystem, including provisioning services (such as food, fuel and fresh water), regulating services (such as ecosystem processes such as climate regulation, water regulation and natural hazard regulation), cultural services (such as spiritual enrichment, recreation, education and aesthetics) and supporting services (such as the services necessary for the production of all other ecosystem services such as water cycling, nutrient cycling and habitat for biota)

Step 1: Identifying values and developing a vision

Identifying values

Values are the internal principles that guide the behaviour of an individual or group. Values determine the importance that people place on the natural environment and how they view their place within it.[14] Associated with values are the benefits and services that people receive from the natural environment; these are often called **ecosystem services**. Differing values may result in people pursuing different objectives in relation to wetland management and restoration, having different reasons for desiring a commonly agreed outcome or favouring different mechanisms to achieve it. Because of this, it is important to be explicit about the values that are driving wetland management and restoration to ensure that the identified values are not incompatible.[14] For example, although two people may value a wetland because its water can sustain animals, one person may want to dig out the wetland so that it supports a particular group of animals while another person may want it to remain the way it is to support a different group of animals. These values may be incompatible. Table 4 provides examples of wetland ecosystem services.

Table 4. Ecosystem services of wetlands.[15,16]

Supporting	Biodiversity (including connected habitat and provision of vital flow regimes). Nutrient dispersal and cycling Soil formation Seed dispersal Habitat to support primary production
Cultural	Recreational opportunities Provision of destinations for tourism Aesthetic values translating into utility for visitors and changes in land values close to wetlands Provision of cultural values Provision of historical values Source of intellectual and spiritual inspiration Scientific discovery

Regulating	Hydrological flow regulation and groundwater recharge/discharge (where water is used for consumptive uses) Carbon sequestration Climate regulation (macro) Local climate regulation and influence on precipitation Water flow regulations and potential mitigation of flood risk Storm and storm surge protection Purification of water as part of a multi-barrier water treatment train Prevention of saline intrusion Purification of air quality Other waste decomposition and detoxification Crop pollination through the provision of habitat for pollinators Pest and disease control through the provision of filtering services and buffers etc
Provisioning	Food (e.g. fish, crustaceans, game, crops (e.g. rice), wild foods, spices etc.) Water (both for consumption and as inputs to other production such as irrigation) Water storage (wetlands can be a substitute for dams) Water transport Fibre, fuel and other raw materials used in economic production Provision of other industrial inputs (e.g. pharmaceuticals) Genetic material (e.g. ornamental species) Energy (e.g. input to hydropower, or biomass fuels)

The identification of key values is an important step in the management planning process as the purpose of each subsequent step is to contribute to the protection of these values. All values of the management area should be identified and described in detail. If multiple values are identified, as is likely to be the case, the project team (in consultation with stakeholders if appropriate) should rank the values in order of priority and determine which values are a priority for protection. In identifying these priority values it should be ensured that all of the selected values are compatible with each other. If some values are considered to be incompatible with each other, this issue needs to be resolved before the management planning process can proceed any further.

example

An example: Values

Table 5. Example of key wetland values and their associated benefits and services.

Value	Benefits and services
Intrinsic value	habitat for migratory and local waterbirds
Aesthetic value	attractive natural landscapes
Recreation value	bird watching, bushwalking and horse riding.

Developing a vision

A vision is the desired state or ultimate condition that a plan is working to achieve which is usually expressed in the form a statement. There is no hard and fast rule on what a vision should or should not include. As a suggestion it may articulate the desired state of the natural environment as well the values driving the management and restoration of a site (e.g. ecosystem service values, opportunity values etc). A good vision should be relatively general, inspirational and simple so that it can be remembered by all members of the project team.[17]

example

An example: Vision

A vision reflecting the values identified in the previous step and the desired state of the natural environment.

To be recognised by the community for its international significance as a habitat for migratory waterbirds and be maintained for its aesthetic and recreation values to be enjoyed by present and future generations. Where natural wetland components and processes are able to function and evolve.

Developing a vision is essential to ensure that all involved in the management planning process are working towards achieving the same thing. Going through the process of developing a vision can also assist in building common ground and language among stakeholders. A vision will also ultimately guide management goals and actions and can be useful to refer back to when facing difficult problems or decisions. In some cases, instead of a vision a set of 'guiding principles', 'principle management objectives', 'broad goal' or similar will be prepared.

Step 2: Identifying key components and processes, assessing condition and setting goals

Key components and processes

After the values of the site have been identified, the next part of the process is to identify the key 'components' and 'processes' that need to be managed to maintain these values. Wetland components are physical, chemical and biological parts of a wetland, from large to very small scale and include the physical form of the wetland, wetland soils, physicochemical properties of the water and wetland flora and fauna (see Table 6). Wetland processes are the forces within a wetland and include those processes that occur between organisms and within and between populations and communities including interactions with the non-living environment and include sedimentation, nutrient cycling and reproduction (see Table 7).[18]

Table 6. Wetland components. Adapted from Department of the Environment, Water, Heritage and the Arts, 2008.[18]

Component	Examples
Physical form	Area of the wetland Wetland form (e.g. depth, shape and bathymetry)
Wetland soils	Site and soil profile characterisation Soil profile classification Soil physical properties (e.g. constituents, structure, texture, consistency and profile) Soil chemical properties (e.g. organic content, nutrients, sulfides, acid neutralising capacity, salts and pH) Soil biological properties (e.g. soil organisms such as bacteria and fungi, invertebrates – shellfish, mites and worms)
Physicochemical soil	Nutrients (e.g. nitrogen, phosphorus) Electrical conductivity Cations and anions pH

Component	Examples
Physicochemical water	Nutrients (e.g. nitrogen, phosphorus) Electrical conductivity Cations and anions Turbidity Temperature Dissolved oxygen pH Nutrient cycling Light attenuation
Biota	Plants Vertebrate fauna (e.g. fish, amphibians, reptiles, waterbirds, mammals) Invertebrate fauna (e.g. insects, crustaceans, worms) Algae Fungi Bacteria

Table 7. Wetland processes. Adapted from Department of the Environment, Water, Heritage and the Arts, 2008.[18] Original source DSE (2005).[19]

Process type	Example
Climate*	Rainfall Temperature Evaporation Wind
Geomorphology*	Topography/morphology Connectivity of surface waters Water source Soils Sedimentation Erosion
Hydrology*	Water balance/budget (water flowing in, water flowing out) Groundwater infiltration and seepage Surface–groundwater interactions Water regime (the pattern of when, where and to what extent water is present in a wetland. The components of water regime are the timing, duration, frequency, extent and depth, and variability of water presence).
Energy and nutrient dynamics	Primary production Nutrient cycling (nitrogen, phosphorus) Carbon cycling Decomposition Oxidation–reduction
Processes that maintain animal and plant populations	Reproduction Regeneration Dispersal Migration Pollination
Species interactions	Competition Predation Succession Herbivory Diseases and pathogens

Process type	Example
Physical processes	Stratification Mixing Sedimentation Erosion Evaporation Infiltration

*For some wetlands these processes may be viewed as components or broken down into their components.

The challenge of this step is to identify the 'key' components and processes. To achieve this, a two stage process is recommended:

1) Identify as many components and processes as possible.

2) Identify and describe the most critical components or processes that need to be managed to maintain the values, benefits and services of the site.

Expert advice will almost certainly be needed to complete this step of the process.

example

An example: Key components and processes

Examples of key wetland components and processes required to maintain the values, benefits and services previously identified.

Table 8. Example of key wetland components and processes and their link to values, benefits and services.

Value	Benefits and services	Key components and processes	Reasoning for selection of component or process
Intrinsic value	Habitat for migratory and local waterbirds	Waterbirds	Value directly dependent on presence of waterbirds
		Wetland and dryland vegetation	Direct source of food and shelter for waterbirds and source of food and shelter for other fauna on which waterbirds feed
		Hydrology	Critical for maintaining all other components and processes
Aesthetic value	Attractive natural landscape	Wetland and dryland vegetation	Presence of wetland and dryland vegetation contributes significantly to attractiveness of the landscape
		Hydrology	Presence of water contributes significantly to attractiveness of the landscape
Recreation value	Bird watching, bushwalking and horse riding.	Birds (including water birds)	Value directly dependent on presence of birds
		Wetland and dryland vegetation	Presence of vegetation critical for undertaking 'bush 'walking and indirectly to maintain presence of birds

Setting goals

Indicators: the specific components and processes of a wetland that are measured in a monitoring program in order to assess changes in the conditions at a site

The ultimate aim of wetland management and restoration is to maintain or restore wetland components and processes which sustain the reasons we value the wetland. In order to assess whether or not management is being successful, 'goals' for key wetland components and processes will need to be set. In this context a **goal** is a specific statement detailing the desired state of a wetland component or process. Goals should be 'smart':

- **s**pecific – the component or process is clearly defined as it its desired state
- **m**easurable – there is some way of measuring what will be achieved
- **a**chievable – the goal is realistic given the resources available
- **r**elevant – the goal is relevant to the vision for the wetland
- **t**ime-bound – there is a time by which the goal is met that is realistic, feasible and meaningful.

When setting goals it is important to keep in mind that the components and processes to which these goals relate will form a set of '**indicators**' which will need to be measured as part of a monitoring program.

It may not always be possible or realistic to be able to measure all key components and processes. Instead goals may be set for a limited number of components and processes, or it may be necessary to set goals for surrogates instead. There are times when it is not practical to measure a component or process. This may be because it is cryptic, slow to respond to environmental change, expensive to assess, poorly understood or simply difficult to quantify. In such cases a surrogate measure may be used. This is another component or process of the system that shows a correlated response. An example of a surrogate measure is the use of aquatic invertebrate community composition to draw conclusions about water quality.

➤ For additional detail on surrogates see the topic 'Monitoring wetlands' in Chapter 4.

If the current and desired state of key components and processes is not known, it will be necessary to obtain this information to be able to set and assess progress towards achieving goals. An excellent understanding of wetland components and processes will be needed to undertake this step of the processes, as such in most instances expert advice will be required.

example

An example: Goals

Examples of goals for selected components and processes previously identified.

Component: Waterbirds

By July 2019, the number of species (species richness) of waterbirds at the site is equal to or greater than 1999 levels.

Note: this goal assumes that the number of species of waterbirds at the site in 1999 is known.

Component: Vegetation

By July 2019, the extent and cover of native vegetation and native plant species richness at the site is equal to or greater than levels in 1999.

Note: this goal assumes that the extent and cover of native vegetation and native plant species richness in 1999 is known.

Distinguishing between outputs and outcomes

When setting project goals and objectives there is often some confusion between outputs and outcomes. Outputs are activities undertaken, or products produced, by a particular project. An outcome, on the other hand, is a measurable consequence of the project's activities. For example, a project may output 20 kilometres of stock exclusion fencing around a wetland. The outcome of this may be a 10 per cent increase in native vegetation biomass within the fenced area, due to reduced grazing pressure. Outputs are steps along the way to achieving the desired outcome. In the context of the management planning process being presented in this topic, goals should always relate to an outcome while objectives (which are discussed later in the document) may relate to an output or outcome.

Step 3: Identifying and ranking threats

This step involves identifying current and potential threats to key wetland components and processes and then assessing how critical each threat is to determine whether there is a need for a management strategy. In this context a **threat** is considered to be any factor that is currently or may potentially negatively affect wetland components or processes. A threat can be currently active or present (such as weeds), or a potential threat (such as a proposal to create a picnic area within an area of native vegetation in excellent condition).

Identifying threats

When discussing threats it is useful to make a distinction between two elements of threat; the source of the threat and the actual stress it causes.[20] For example foxes (threat) eat waterbird eggs resulting in reduced breeding success of the birds (stress). This distinction isn't always easy to make but is an important one to make when it comes to selecting management strategies. When identifying threats it is important to focus on those impacting on the key wetland components and processes identified Step 2. Some common threats to wetlands are shown in Table 9.

➤ For additional detail on a number of common threats to wetlands see the topics in Chapter 3 'Managing wetlands'.

Table 9. Common threats to wetlands.

Threat	Stress on wetland component or process
Altered hydrology	Death of native vegetation due to excessive/insufficient water, change in the ecological character of the wetland
Acid sulfate soils	Death of plants and animals due to acidification of wetland waters
Weeds	Reduction in extent and cover of native vegetation due to competition by weeds
Water and soil pollution/contamination	Death of plants and animals
Diseases such as Phytophthora dieback	Decline and or death of native vegetation
Introduced fauna	Reduction in animals diversity due to predation and competition with introduced animals
Livestock grazing	Reduction in extent and cover of native vegetation due to physical damage and competition by weeds
Secondary salinity	Decline and or death of native vegetation and reduced richness and abundance of aquatic animals
Inappropriate fire regime	Reduction in extent and cover of native vegetation and reduction in richness and abundance of animals

example

An example: Identifying threats

Table 10. Example of key component and processes and the identified threats.

Key components and processes	Threats
Birds (including waterbirds)	Introduced predators
Wetland and dryland vegetation	Weeds - arum lily
Hydrology (water balance and water regime)	Over-extraction of groundwater

It is common to find that many threats are inter-connected and that multiple threats may be contributing to a single stress. For example over-abstraction of groundwater may result in a decrease in the duration, extent and depth of inundation (altered water regime) which may in turn result in a decline in the extent, cover and diversity of vegetation. A decrease in the duration, extent and depth of inundation may allow for an increase in the extent and cover of arum lily, contributing to decline in the extent, cover and diversity of native vegetation (see Figure 3). The interrelationships between threats can be very complex and it is wise to seek expert opinion for this part of the management planning process. To unravel these relationships, it may be useful to create a web diagram as shown in Figure 3. These diagrams can also help you to understand the synergies and cumulative nature of existing and potential threats on the wetland.

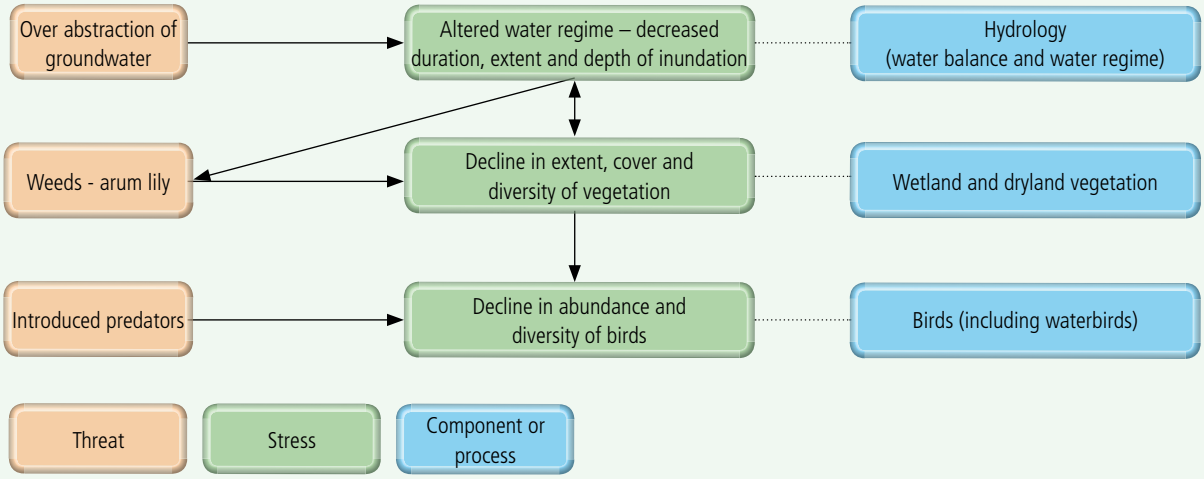


Figure 3. Web diagram illustrating the inter-connectedness of the threats 'weeds' and 'over-extraction of groundwater'.

Threat ranking

If more than one threat has been identified, as will nearly always be the case, a process of 'threat ranking' needs to be undertaken to determine which threats are a priority for management. Threat ranking can be undertaken for a site as a whole or applied to each key wetland component and process (as identified in Step 2). There are numerous threat ranking (sometimes also called risk assessment) methodologies available using different assessment criteria (effect, scope, severity etc.) and different scoring systems (e.g. quantitative versus qualitative and absolute versus relative ranking). Regardless of which methodology is selected, the most important thing is that the methodology is well document and clearly explained so that other can repeat the process. It is also critical that any assumptions or decisions made whilst applying the threat ranking are also documented.

The key aim of assessing the significance of the threat to the wetland is to determine whether there is a need for management for this specific threat to a wetland value(s), and therefore the development of a management strategy.

An example of a threat ranking methodology is presented below.

example

An example: Threat ranking

This methodology utilises a relative scoring system where for each criteria; 'scope', 'severity' and 'likelihood' each threat is given a rank relative to the other threats.

1. Rank each threat for 'scope'

Scope: refers to the proportion of the overall area likely to be affected by a threat in a given timeframe (for example, ten years).

2. Rank each threat for 'severity'

Severity: attempts to quantify or categorise the level of damage to the site in the specified time frame.

3. Rank each threat for 'irreversibility'

Irreversibility: is the degree to which the effects of a given threat can be reversed.

4. Add up the ranking scores

Record any recommendations, assumptions or knowledge gaps identified during the threat ranking process.

Table 11. Example of a 'relative' threat ranking for a site as a whole using the criteria 'scope', 'severity' and 'likelihood'.

Threat	Scope	Severity	Irreversibility	Total	Classification
Introduced predators	1	2	1	4	Medium
Weeds - arum lily	2	1	2	5	Medium
Over-extraction of groundwater	3	3	3	9	High

As a result of the threat ranking process, managers should have a clear idea of which threats are a priority for management as well as any knowledge gaps that may require the formulation of a management strategy.

Step 4: Selecting management strategies and setting objectives

In the context of this management planning process the term **strategy** is used to describe a set of actions that will be undertaken in order to achieve goals relating to a wetland component or process. Normally strategies will focus on addressing the threats to components and processes however, it may also be necessary to develop strategies to directly improve the condition of a component or process. Strategies formulated to address a threat may for example include 'weed control' or an 'awareness-raising campaign' whilst strategies formulated to directly improve the condition of a component or process may include a 'captive breeding program' or 'revegetation'.

It is paramount that any threats causing a decline in the condition of the component or process are addressed before any strategies are implemented to directly improve its condition of a component or process.

➤ For additional detail and guidance on management strategies for specific threats see individual topics in Chapter 3 'Managing wetlands'.

Selecting management strategies

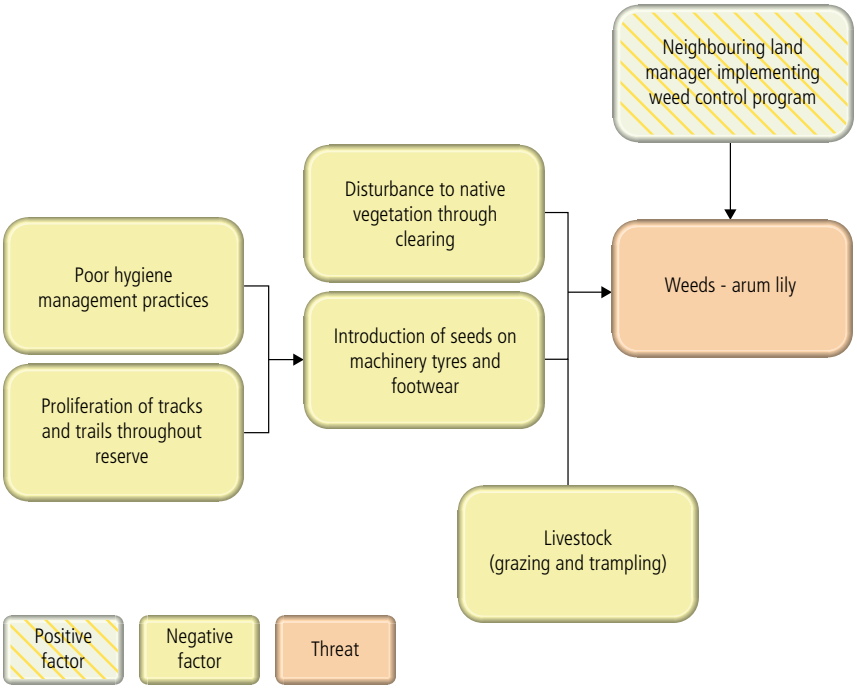
The following methodology for identifying and ranking management strategies has been adapted from WWF Project and Programme Standards.[21]

In order to identify management strategies for each of the high-ranked threats, the following steps should be undertaken (repeat steps 1–3 separately for each high ranked threat):

1. Identify all of the factors affecting the threat including both positive and negative factors.

   For example for the threat 'weeds' look at how weeds are entering and spreading within the site e.g. livestock, machinery used for firebreak maintenance, overland flow of water as well as any positive factors such as a neighbouring landholder implementing a weed control program. A useful way of completing this step is to draw a web diagram or a chain for each threat (see Figure 4 below).

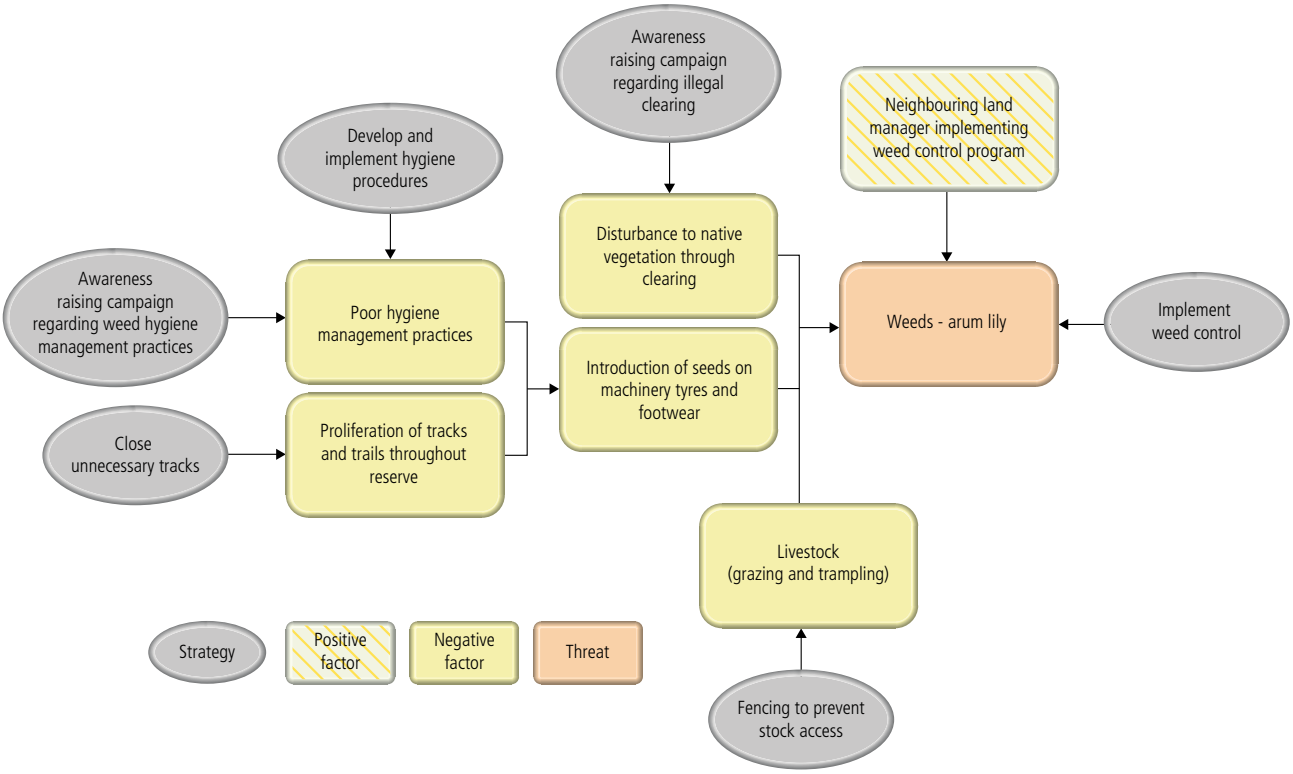
Figure 4. Web diagram showing the threat 'weeds' and the factors affecting weeds.



2. Brainstorm strategies that could be used to counter the threat and the factors affecting it.

   Using the weeds example above, weed control could be undertaken to remove weeds, fencing could be erected to prevent stock access, hygiene procedures implemented to prevent seeds entering via machinery used for firebreak maintenance and unnecessary tracks could be closed (see Figure 5 below). When brainstorming strategies *focus on the causes of a problem, rather than the symptoms.* For example, while weed mapping and control is important, you are going to be forever weeding, unless you identify and address the sources of weeds.

Figure 5. Web diagram showing the threat 'weeds' and the factors affecting weeds and potential management strategies.



3. Narrow down the list of strategies by eliminating those that are not likely to be effective or feasible.

   It is at this stage that some tough decisions may need to be made regarding the feasibility of tackling some threats particularly those such as secondary salinity or altered catchment hydrology which require considerable technical expertise to fully understand the threats and develop appropriate management strategies, require management strategies to be implemented beyond the geographic scope of the management area and will require significant resources for successful management.

4. Repeat the above steps for all other high-ranked threats.

5. Rank potential strategies for all high-ranked threats.

   Even after narrowing down the list of potential strategies by eliminating those that are not likely to be effective or feasible, it is likely that there will be more strategies than can be realistically addressed. To narrow down the number of strategies it may be a good a idea to rank strategies according at a set of criteria such as:

   - Likelihood – how likely is the strategy in being successful in countering the threat/s?
   - Feasibility – are the necessary skills and resources (political, financial and human) available to undertake the strategy?
   - Cost – even if the necessary resources are available, what is the cost of the strategy in comparison to others that may have similar benefits.
   - How many threats will the strategy address – it may be possible that a single strategy will it address a number of threats.
   - Gap – does the strategy fill a gap that isn't already been address by another project? Is there another project already undertaking this strategy?

6. Select strategies and document any assumptions and decisions.

Using the ranking, select the strategies to be implemented. For each selected strategy document any assumptions regarding how the strategy will counter the threat it is selected to address particularly in terms of any awareness-raising or education related strategies (see Figure 6). For each selected strategy, document the threat it will address, and the components and processes that will be maintained or improved by addressing the threat (see Table 12).

Figure 6. Example of an awareness-raising strategy and the assumed steps that need to occur in order for the strategy to be successful.

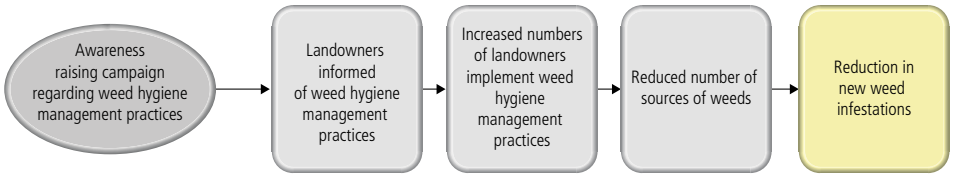


Table 12. Example of relationships between strategies, threats, wetland components and processes and associated goals.

Strategy	To address threat/s	Components and processes maintained or improved	Associated goal/s
Awareness raising campaign regarding weed hygiene management practices	Weeds	Native vegetation	By July 2019, the extent, cover and species diversity of native vegetation is equal to or greater than levels in 1999.
Fox control strategy	Foxes	Birds (including waterbirds)	By July 2019, the number of species (species richness) and abundance of waterbirds at the site is equal to or greater than 1999 levels.

7. Assess whether any strategies to directly improve the condition of key components and processes are required.

Once strategies to address key threats have been developed, it may be necessary to look at each key component and process and decide if any management strategies are required to directly improve the condition of the component or process. If such strategies are required, repeat steps 3 – 6 as described above, relating each step to strategies to directly improve the condition of key wetland components are processes (rather than strategies to address key threats).

➤ For additional detail and guidance on management strategies for specific threats see individual topics in Chapter 3 'Managing wetlands'.

Feasibility of addressing threats

The feasibility of addressing threats needs to be carefully considered when developing and selecting management strategies. Addressing a threat may not be feasible if any of the following are required in order to address it:

- considerable technical expertise to fully understand the threat and develop appropriate management strategies
- management strategies to be implemented beyond the geographic scope of the management area
- significant resources for successful management.

Common threats for which the feasibility of management needed to be carefully considered include altered hydrology and introduced fauna. Both of these issues require specialised expertise, the implementation of management strategies over a large geographical area (usually greater than one manager has control over) and significant resources for successful management.

In such circumstances it may be best to make use of the planning process to define the scope of a further study or plan. Care should be taken to ensure that if issues are deferred or subject to a parallel planning process, their links to the primary management plan are clearly stated and can be incorporated back into the management plan at a later date.

For example the topic 'Managing hydrology' in Chapter 3 describes how the hydrological regime of a wetland is directly affected by land use within a catchment, and drainage and groundwater extraction that occurs. Trying to address catchment management issues within a wetland management plan is likely to be of limited success unless you are in the fortunate position of being able to control and/or influence activities within the entire catchment. An effective approach to addressing catchment-scale issues, without getting caught up in them, is to support the preparation of a catchment management plan for the wetland catchment, or the incorporation of the wetland catchment into a wider natural resource management plan or catchment plan. Alternatively, where a relevant catchment plan exists, refer to it in the current plan, and highlight proposed strategies that address the threats faced by the wetland. Identify management strategies that will complement those in the catchment plan. Identify links between the plans and seek opportunities for investment and external support.

Setting objectives

As previously mentioned, the ultimate aim of wetland management and restoration is to maintain or restore wetland components and processes (which support wetland values). The purpose of the management strategies that have now been selected is to address the threats affecting the wetland components and processes or directly improve the condition of key components and processes. The goals that were previously set will allow the effectiveness of these strategies to be monitored in the long term however, objectives should also be set to monitor the progress of strategies in the short to medium-term.

Objectives are a statement detailing a short to medium-term result of a strategy, which may relate to an output or outcome as it relates to the state of a threat. Objectives should be **SMART**:

- **s**pecific – the desired output or outcome as it relates to the state of a threat is clearly defined
- **m**easurable- there is some way of measuring what will be achieved
- **a**chievable – the objective is realistic given the resources available
- **r**elevant – the objective is relevant to achieving the goals for key components and processes
- **t**ime-bound – there is a time by which the objective is met that is realistic, feasible and meaningful.

For each management strategy, at least one management objective should be set so that the effectiveness of the strategy in the short to medium-term can be evaluated. Where a number of assumptions have been made regarding how the strategy will result in reducing a threat, objectives to monitor these assumptions should also be set (see following example).

example

An example: Objectives

Strategy: Awareness raising campaign regarding weed hygiene management practices

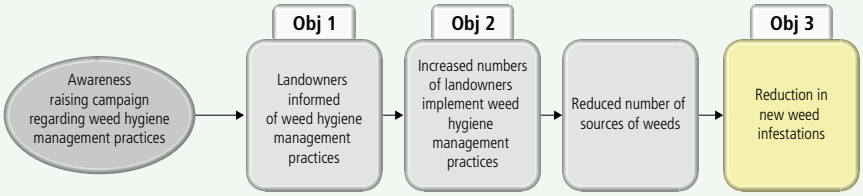


Figure 7. Example of an awareness-raising strategy, the assumed steps that need to occur and the objectives that need to be met in order for the strategy to be successful.

Objective 1: By July 2010 two training events held, informing 100 land managers, living within the Lake Quenda catchment, of weed hygiene management practices.

Objective 2: By July 2011 there has been a 10 per cent increase in the number of land managers, living within the Lake Quenda catchment, implementing weed hygiene management practices compared to the number in 2009.

Objective 3: By July 2011, no new weed infestations as compared to the number in July 2010.

Step 5: Action planning

The final step in preparing a management plan is working out how all of the planning will be put into practice. In this step of the process, management strategies will be broken down into specific actions and for each action, who, when and how much will be determined. Similarly each goal and objective will be broken down into the indicators that will be monitored and for each of these how, when, where and who will be determined.

Implementing management strategies

For each management strategy, the goals and objectives that the strategy will directly or indirectly contribute to achieving should be outlined to make it clear what the particular strategy is trying to achieve. For each management strategy, a series of actions should then be presented to detail the specific works or projects that will be carried under that strategy. At this stage it is important to stick to major activities rather than going into detail of individual tasks. For example stick to 'Obtain quotes for weed control work' rather than 'compile a list of local weed control contractors', 'prepare request for quote documentation' etc. For each action, it is recommended that the following are identified:

- *who* will undertake the action (including any external parties)
- *when* the action will be completed
- *how* much it will cost to implement the action.

It is recommended that the above information be summarised in a table in the plan so that readers can easily gain an understanding of what, who and when actions will be undertaken and how much they will cost (see Table 13). If required, additional detail for each action can be presented. For example 'approximate cost' can be further separated into 'internal funding' and 'external funding required'. This process should then be repeated for each management strategy.

example

An example: Strategy implementation plan

Table 13. Example of an implementation plan for the strategy 'Implement weed (arum lily) control'.

Strategy: Implement weed (arum lily) control				
Objective: By July 2012, the extent of arum lily (percent cover) has been reduced by 50 per cent compared to the 2009 level.				
Contributes to achieving the following goal/s: **Goal**: By July 2019, the extent and cover of native vegetation and native plant species richness at the site is equal to or greater than levels in 1999.				
	Who?	**When?**	**How much?**	**Comments**
Activity 1. Identify priority areas for arum lily control based on vegetation and weed mapping (produced as part of monitoring plan)	Sam Jones Jenny Smith	August 2009	Internal staff costs not applicable – already covered by core funds	
Activity 2. Prepare detailed weed control program for areas A, and B	Sam Jones Jenny Smith	November 2009	NA	
Activity 3. Obtain quotes for weed control work in areas A and B and award contract	Sam Jones	February 2010	NA	
Activity 4. Weed control works undertaken by contractor	External contractor	August 2010	$3,000	Herbicide application between June and September
Activity 5. Inspect weed control works	Sam Jones	August 2010	NA	
Activity 6. Follow up weed control works	External contractor	August 2010	$1,500	Herbicide application between June and September
Activity 7. Inspect weed control works and assess need for revegetation	Sam Jones Jenny Smith		NA	If revegetation is required, develop implementation plan for 'Revegetation' strategy
Total budget:			$4,500	

Once each strategy has been broken down into individual actions with timeframes, it may be useful to compile this information into a Gantt chart for the entire project (see Table 14 for an example). It is also advisable to incorporate monitoring activities and their timeframes into this chart as they are an integral part of any wetland management project. Displaying this information in a Gantt chart will allow for the start and finish dates of tasks to be seen as well as any overlap in the timeframe of tasks. By listing the sequence of actions under each strategy you will be able to check the feasibility of achieving the objective/s of the strategy within the given timeframe and schedule activities into a works program.

example

Table 14. Example of a Gantt chart for a wetland management project showing all management and monitoring activities and their associated timeframes.

	2009				2010				2011			
	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Strategy: Weed (arum lily) control												
Activity 1. Identify priority areas for arum lily control based on vegetation and weed mapping (produced as part of monitoring plan)		■	■									
Activity 2. Prepare detailed weed control program for areas A, and B				■								
Activity 3. Obtain quotes for weed control work in areas A and B and award contract				■	■							
Activity 4. Weed control works undertaken by contractor						■	■					
Activity 5. Inspect weed control works								■				
Activity 6. Follow up weed control works										■	■	
Activity 7. Inspect weed control works and assess need for revegetation											■	
Monitoring		■	■				■	■			■	■
Strategy: Awareness raising campaign regarding weed hygiene management practices												
Activity 1. Compile information on weed hygiene management practices	■	■										
Activity 2. Organise two training events		■										
Activity 3. Deliver two training events			■	■								
Monitoring			■	■			■				■	

Implementing monitoring activities

During the planning process, goals and objectives have been set in order to measure the success of management strategies in the short, medium and long term. It is now time to determine the what, how, where, when and who for the measurement of each goal and objective. For each goal and objective it is recommended that the following are identified:

- what will be measured (indicator)
- how will it be measured (method)
- where will the measurement be taken
- when will it be measured
- who will measure.

It is recommended that the above information be summarised in a table so that readers can easily gain an understanding of what, how, where, when and who for the measurement of each goal and objective (see Table 15).

example

An example: Monitoring implementation plan

Table 15. Example of a monitoring implementation plan.

Goal: By July 2019, the extent and cover of native vegetation and native plant species richness at the site is equal to or greater than levels in 1999.					
What? (Indicator)	**How?** (Methods)	**When?**	**Who?**	**Where?**	**Comments**
extent and cover of native vegetation and native plant species richness	On-ground survey	Spring 2009 Spring 2014 Spring 2019	Sam Jones Jenny Smith	Lake Quenda	Need to document standard survey methods
Strategy: Awareness raising campaign regarding weed hygiene management practices					
Objective 1: By July 2010 two training events held, informing 100 land mangers, living within the Lake Quenda catchment, of weed hygiene management practices.					
What? (Indicator)	**How?** (Methods)	**When?**	**Who?**	**Where?**	**Comments**
no. of training events no. of land managers attending	Check register of attendees at training events	June – November 2009	Sam Jones	TBA	Exact location and dates of training events will be known by end of May 2009
Objective 2: By July 2011 there has been a 10 per cent increase in the number of land managers, living within the Lake Quenda catchment, implementing weed hygiene management practices compared to the number in 2009.					
What? (Indicator)	**How?** (Methods)	**When?**	**Who?**	**Where?**	**Comments**
no. land managers, living within the Lake Quenda catchment, implementing weed hygiene management practices	Telephone survey of land managers	July 2009 July 2011	Sam Jones	Within the Lake Quenda catchment	Need to define 'weed hygiene management practices'
Objective 3: By July 2011, no new weed infestations as compared to the number in July 2010.					
What? (Indicator)	**How?** (Methods)	**When?**	**Who?**	**Where?**	**Comments**
no. weed infestations	On-ground survey	July 2010 July 2011	Sam Jones Jenny Smith	Lake Quenda	Need to define 'weed infestation' and document standard survey methods

The first and most important step in measuring goals and objectives is to determine what will be measured or the 'indicator'. Take for example the goal 'By July 2019, the extent and cover of native vegetation and native plant species richness is equal to or greater than levels in 1999'. The indicator to be measured in this example is native vegetation. This is a relatively straightforward indicator as it is natural component of the wetland which is relatively easy to measure. For a more complex example take the objective 'By July 2011 there has been a 10 per cent increase in the number of land managers, living within the Lake Quenda catchment, implementing weed hygiene management practices compared to the number in 2009'. In this example the indicator is land managers, living within the Lake Quenda catchment, implementing weed hygiene management practices. This indicator may require some further definition particular in terms of determining what is considered to be a 'weed hygiene management practice'.

➤ For additional detail on selecting and monitoring indicators that are natural wetland components and processes see the topic 'Monitoring wetlands' in Chapter 4.

STAGE C: IMPLEMENTING

This is the most satisfying stage of the management planning process: putting the planning into action. With sound planning, this stage of the process should be relatively straightforward. When implementing a management plan it is important to keep in mind that monitoring, evaluating and reviewing the plan is an integral part of implementation and should be an on-going component of the implementation process.

STAGE D: EVALUATING AND ADAPTING

Regular evaluation of a management plan is essential for adaptive management and as mentioned above should be an on-going component of the implementation process. There are three type of evaluation:

- progress - reviewing what has been implemented
- performance - auditing the implementation of the plan
- complete – re-assessing and adapting the plan itself.

The three types of evaluation should be undertaken at different stages of the management planning process. The three types of evaluation are outlined Table 16.

Table 16. The different types of management plan evaluations.

	Type of evaluation		
	Progress	**Performance**	**Complete**
Stage of implementation	Throughout term of plan	Throughout term of plan	When circumstances or conditions at the site change considerably or at end of the term of the plan
Frequency	Weekly to monthly	Quarterly to annually	As required
Level of detail	Basic	Detailed	Comprehensive
Components for review	Progress of: • Strategy implementation plan, and • Monitoring implementation plan.	Performance of: • Completed strategies • Progress towards objectives and goals.	Complete re-assessment of: • Values and vision • Key components and processes and goals for their conditions • Key threats • Management strategies and objectives to measure their success.

Progress evaluation

Reviewing the implementation of the plan is important to ensure that it is progressing as scheduled. The progress of both the 'strategy implementation plan' and 'monitoring implementation plan' should be reviewed. These should be reviewed on a regular basis, weekly to monthly, depending on the frequency at which the project activities are being implemented. If either of these plans is behind or ahead of schedule, the following questions should be considered:

- What is the cause for the departure from the schedule?
- Are further changes to the schedule expected?
- Does the schedule need to be amended?

If necessary the 'strategy implementation plan' and 'monitoring implementation plan' should be amended accordingly.

Performance evaluation

Auditing the result of a management plan is critical to ensuring that a plan is achieving what it set out to achieve. To audit the result of a management plan, both goals and objectives need to be examined. Progress towards achieving goals and objectives should be reviewed in addition to auditing after the timeframe for the goal or objective has passed. Take for example the goal 'By July 2019, the extent and cover of native vegetation and native plant species richness at the site is equal to or greater than levels in 1999', the progress towards achieving this goal may be reviewed annually in addition to an audit in July 2019. If the progress towards goals or objectives is not occurring as expected or goals or objectives have not been met, the following questions should be considered:

1. Why is progress towards goals or objectives not occurring as expected or goals or objectives not being met?
    a. Is the selected strategy not achieving what it was meant to achieve?
    b. Is there an issue with goal/objective (e.g. it wasn't achievable)?
    c. Is there an issue with both the strategy and the goal/objective?
2. Do any goals, objectives or strategies need to be amended?

If necessary the 'strategy implementation plan' and 'monitoring implementation plan' should be amended accordingly.

Complete evaluation

A re-assessment of a management plan should occur if conditions or circumstances at the site change considerably or at the end of the term of a plan. Changes to the circumstances or conditions at the site which may warrant the re-assessment of a management plan may include:

- new legislation is enacted which affects the management of the site
- change of land ownership
- change in the values that the site it being managed, for example, no longer being managed for recreation or a new component or process is identified as being key to maintain values
- new threat identified
- scope or severity of an existing threat increases.

If any considerable changes to the circumstance or conditions at the site occur, all components of the plan should be re-assessed (see Table 1). Similarly at the end of the term of a plan all components of a management plan should be reviewed, and it is likely that many will need to be adapted accordingly.

SOURCES OF MORE INFORMATION ON WETLAND MANAGEMENT PLANNING

Websites

Foundations of Success

Foundations of Success is a not-for-profit organization committed to working with practitioners to learn how to do conservation better through the process of adaptive management.

www.fosonline.org/

WWF Standards of Conservation Project and Programme Management

www.panda.org/what_we_do/how_we_work/conservation/programme_standards/

Standards of practice for planning and implementing conservation projects and programmes.

The Nature Conservancy: Nature by design

www.nature.org/aboutus/howwework/cbd/science/art19228.html

The basic concepts of Conservation by Design are simple: setting goals and priorities, developing strategies, taking action and measuring results.

Conservation Management System Consortium

www.cmsconsortium.org/

The CMS Consortium (CMSC) is a group of conservation organisations whose aim is to raise standards in conservation and countryside management

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GLOSSARY

Adaptive management: an approach that involves learning from management actions, and using that learning to improve the next stage of management

Consanguineous suite: area/s defining a group of wetland with common or interrelated features[29]

Ecosystem services: benefits that people receive or obtain from an ecosystem, including provisioning services (such as food, fuel and fresh water), regulating services (such as ecosystem processes such as climate regulation, water regulation and natural hazard regulation), cultural services (such as spiritual enrichment, recreation, education and aesthetics) and supporting services (such as the services necessary for the production of all other ecosystem services such as water cycling, nutrient cycling and habitat for biota)

Goal: a specific statement detailing the desired state of a wetland component or process

Indicators: the specific components and processes of a wetland that are measured in a monitoring program in order to assess changes in the conditions at a site

Management planning: the process of setting management goals for a site and then developing, implementing and reviewing management strategies to meet these goals

Management strategy: a set of actions that will be undertaken in order to achieve goals relating to a wetland component or process

Objective: a statement detailing a short to medium-term result of a strategy, which may relate to an output or outcome as it relates to the state of a threat

Ramsar Convention: an international treaty that focuses on the conservation of internationally important wetlands signed in Ramsar, Iran in 1971

Stakeholder: individuals, groups or institutions that have an interest in or will be affected by a project's activities

Strategies: in the context of management planning, a set of actions that will be undertaken in order to achieve goals relating to a wetland component or process

Threat: any factor that is currently or may potentially negatively affect wetland components or processes. A threat can be currently active or present (such as weeds), or a potential threat (such as a proposal to expand a picnic area into native vegetation in good condition)

Values: the internal principles that guide the behaviour of an individual or group and determine the importance that people place on the natural environment and how they view their place within it

Vision: the desired state or ultimate condition that a plan is working to achieve which is usually expressed in the form a statement

Wetland components: the physical, chemical and biological parts of a wetland, from large-scale to very small scale and include the physical form of the wetland, wetland soils, physicochemical properties of the water and wetland flora and fauna

Wetland processes: the forces within a wetland and include those processes that occur between organisms and within and between populations and communities including interactions with the non-living environment and include sedimentation, nutrient cycling and reproduction

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A guide to managing and restoring wetlands in Western Australia

Funding, training and resources

In Chapter 1: **Planning for wetland management**

Version 1

Australian Government

Department of Environment and Conservation

Our environment, our future

Introduction to the guide

Western Australia's unique and diverse wetlands are rich in ecological and cultural values and form an integral part of the natural environment of the state. *A guide to managing and restoring wetlands in Western Australia* (the guide) provides information about the nature of WA's wetlands, and practical guidance on how to manage and restore them for nature conservation.

The focus of the guide is natural 'standing' wetlands that retain conservation value. Wetlands not addressed in this guide include waterways, estuaries, tidal and artificial wetlands.

The guide consists of multiple topics within five chapters. These topics are available in PDF format free of charge from the Western Australian Department of Environment and Conservation (DEC) website at www.dec.wa.gov.au/wetlandsguide.

The guide is a DEC initiative. Topics of the guide have predominantly been prepared by the department's Wetlands Section with input from reviewers and contributors from a wide range of fields and sectors. Through the guide and other initiatives, DEC seeks to assist individuals, groups and organisations to manage the state's wetlands for nature conservation.

The development of the guide has received funding from the Australian Government, the Government of Western Australia, DEC and the Department of Planning. It has received the support of the Western Australian Wetlands Coordinating Committee, the state's peak wetland conservation policy coordinating body.

For more information about the guide, including scope, purpose and target audience, please refer to the topic 'Introduction to the guide'.

DEC welcomes your feedback and suggestions on the guide. A publication feedback form is available from the DEC website at www.dec.wa.gov.au/wetlandsguide.

Contents of the guide

These topics are available in PDF format free of charge from the DEC website at www.dec.wa.gov.au/wetlandsguide.

'Funding, training and resources' topic

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The following people have been consulted in the development of this topic:

Christina Mykytiuk, DEC
Jennifer Higbid, DEC
Tracey Bell, DEC
Ray Pybus, DEC
Dr Ken Atkins, DEC

The valuable contribution of each of these people, and people who have contributed their photos, is gratefully acknowledged.

Project manager: Justine Lawn, DEC

Publications management: Joanna Moore

Graphic design: Stuart Ridgway, Stuart Ridgway Design

Recommended reference

When referring to the guide in its entirety, the recommended reference is: Department of Environment and Conservation (2012). *A guide to managing and restoring wetlands in Western Australia*. Department of Environment and Conservation, Perth, Western Australia.

When specific reference is made to this topic, the recommended reference is: Department of Environment and Conservation (2012). 'Funding, training and resources', in *A guide to managing and restoring wetlands in Western Australia*, Prepared by C Denton, Department of Environment and Conservation, Perth, Western Australia.

Contents

INTRODUCTION

This topic provides information on funding, training and resources related to wetland management and restoration.

Funding and training programs change in response to government and non-government priorities and demand, and new resources regularly become available. For this reason, the information in this topic may be updated at regular intervals. If you know of funding, training or resources relevant to WA wetlands that should be listed in this topic, or changed details for listed programs, we would appreciate you letting us know by emailing us at wetlands@dec.wa.gov.au or via the publication feedback form, available from the DEC website at www.dec.wa.gov.au/wetlandsguide.

Users should check the currency of program information before planning on accessing support from the programs featured in this topic.

HOW TO USE THIS TOPIC

This topic has been arranged in three sections:

1. funding

2. training

3. resources

➤ For information on the roles and responsibilities of stakeholders, including government and non-government organisations, see the topic 'Roles and responsibilities' in Chapter 5.

FUNDING

This section provides an overview of the main funding opportunities for wetland management and restoration activities. The list is not exhaustive and individuals will need to investigate each option further for more details. There are various funding and grant 'search engines' available on the internet and the most relevant to wetlands are listed in this section.

Funding opportunities are listed under the following headings:

- funding programs
- funding directories
- labour programs
- land sale, purchase or donation
- legal protection
- management agreements

Funding programs

There are many funding programs available for a range of environmental projects and activities. The following funding programs are useful for sourcing funds for wetland management activities.

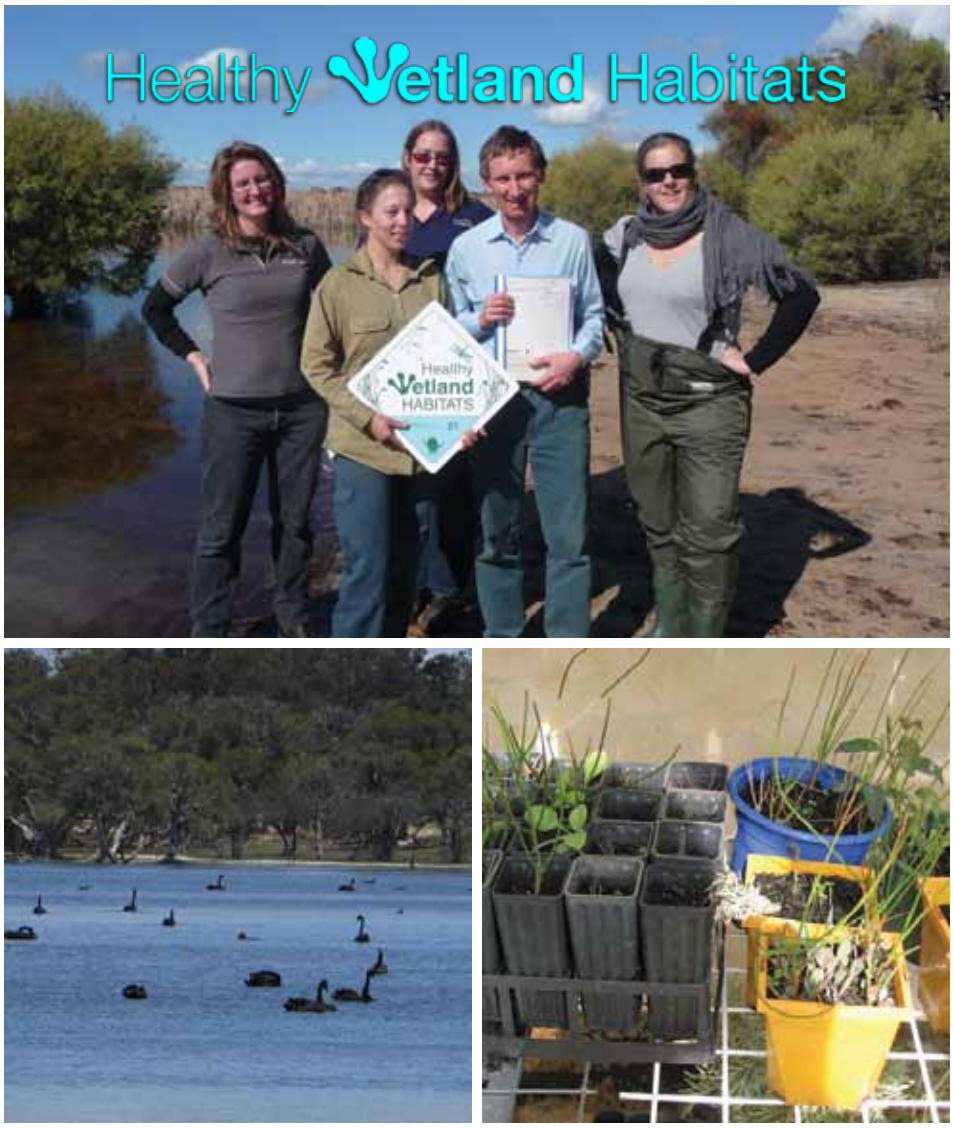

Figure 1. Some of the sites and activities funded by DEC's Healthy Wetland Habitats program. Photos – (top) A Fairs/DEC, (below) A and M Elliott.

Table 1. Funding programs available in Western Australia

Funding program	Funding target	What the program funds	How much funding is available	Funding closing date	For further information	Geographic spread
Biodiversity fund, Australian Government	Land managers of public and private land	Revegetation, weed and introduced animal control, and protecting and managing high conservation areas			www.environment.gov.au/cleanenergyfuture/biodiversity-fund/index.html	National (round two: in WA, south-west and urban waterways and coastal environments)
Busselton Biodiversity Bids, Shire of Busselton	Organisations	Services and activities that deliver environmental benefit	Up to $50,000		www.busselton.wa.gov.au	Shire of Busselton
Busselton Biodiversity Incentives Strategy, Shire of Busselton	Private landholders	Subdivision incentives and rate rebates	Rate rebates of $250–$1,500 annually	Ongoing	Shire of Busselton (08) 9781 0444 www.busselton.wa.gov.au/services/environmental_planning/biodiversity	Shire of Busselton
Caring for our Country (CfoC), Australian Government	Non-government organisations Landcare groups Community groups State and local government Industry Business	Priority targets are identified for each financial year Provides funding for a broad range of sustainable land management and environmental protection work	Over $2 billion in total funding between 2008–2013 The size of the grants range from $30,000–$600,000	Varies	Caring for our Country Information line 1800 552 008 www.nrm.gov.au/funding	National
Community Funding Program, Serpentine Jarrahdale Shire and Byford and Districts Branch of Bendigo Bank ®	Community groups	Project funding such as seed funding for new groups, environmental restoration or facility upgrades	Up to $1,500		Community Development Officer 9526 1137 www.sjshire.wa.gov.au/grant-funding/	Shire of Serpentine Jarrahdale
Community Grants Program, City of Rockingham	Not for profit groups and community organisations	Environmental and conservation initiatives	$500–$2000	Varies	City of Rockingham (08) 9528 0333 www.rockingham.wa.gov.au/Leisure-and-recreation/Grants-and-awards/Community-grants.aspx	City of Rockingham
Community Grants, State NRM Program	Catchment and community groups, industry groups, not for profit organisations, local government authorities and education institutions	On-ground natural resource management action at a local level	In 2012, grants of $10,000–$50,000 were provided from funding of $3 million	Varies	State NRM Office www.nrm.wa.gov.au/grants/state-nrm-program.aspx	State-wide
Community Sponsorship Program, City of Gosnells	Conservation groups and community organisations	Environmental works such as weed control, educational displays, minor equipment and volunteer training and development	Up to $5,500	March 2013	barmstrong@gosnells.wa.gov.au www.gosnells.wa.gov.au/scripts/viewoverview_contact.asp?NID=12657	City of Gosnells
Conservation Zone Rate Rebate, Shire of Serpentine Jarrahdale	Landowners with areas of high conservation value	Reward landowners who protect biodiversity values in bushland and wetland areas	Substantial reductions in shire rates	Varies	Environmental Officer at the Shire of Serpentine Jarrahdale (08) 9526 1111 www.sjshire.wa.gov.au/biodiversity/	Shire of Serpentine Jarrahdale

Funding program	Funding target	What the program funds	How much funding is available	Funding closing date	For further information	Geographic spread
Environmental Community Grants, the Minister for Environment	Private landholders Community groups Conservation/environmental organisations	Biodiversity conservation Sustainable catchment management Protection of high-value areas	Varies; $1.6 million total in 2012	Varies	Environmental Community Grants Coordinator, DEC (08) 9442 0300 grants@dec.wa.gov.au www.dec.wa.gov.au/ecg	State-wide
Gordon Reid Conservation of Natural Heritage Grant (Lotterywest)	Not for profit organisations and local government authorities	Conservation of the state's natural habitats and biodiversity Revegetation activities Research projects	Varies	November	(08) 9340 5270 www.lotterywest.wa.gov.au/grants/grant-types/heritage-and-conservation/natural-heritage	State-wide
Grants to Voluntary Environment and Sustainability and Heritage Organisations (GVESHO), Australian Government	Community based environment and heritage organisations	Conservation and protection of Australia's natural environment and historic heritage	$1.3 million total over the course of the program	Varies	GVEHO Program Team (02) 6274 2422 gveho@environment.gov.au www.environment.gov.au/about/programs/gveho/index.html	National
Healthy Habitats, Shire of Serpentine-Jarrahdale	Landowners	Natural areas of conservation value		Ongoing	Environmental Officer at the Shire of Serpentine-Jarrahdale (08) 9526 1111 www.sjshire.wa.gov.au/biodiversity/	Shire of Serpentine-Jarrahdale
Healthy Wetland Habitats, DEC	Landholders	Technical and financial support Assistance with wetland management plans Activities such as fencing and weed control	Up to $10,000	Ongoing	Healthy Wetland Habitats Coordinator (08) 9219 8788 www.dec.wa.gov.au/hwh hwh@dec.wa.gov.au	Swan Coastal Plain (Perth and surrounds, from Jurien Bay – Dunsborough)
Landcare Community Grants	Landcare groups Coastcare groups	Projects aimed at improving the environment			www.landcareonline.com/funding_opportunity_details.asp?fo_id=9 Some ad hoc projects funded via DAFWA: Natalie Moore (08) 9368 3166 natalie.moore@agric.wa.gov.au.	National
Landowner Biodiversity Conservation Grants, City of Cockburn	Cockburn landowners with property in the Rural, Rural Living and the Resource Zones	Conservation of natural wetland areas on private property	Up to $3,000	Close 31 October each year	Environmental Services Section (08) 9411 3444 www.cockburn.wa.gov.au/Council_Services/Environment/Grants_and_Subsidies/default.asp	City of Cockburn

Funding program	Funding target	What the program funds	How much funding is available	Funding closing date	For further information	Geographic spread
Nature Conservation Covenant Program, DEC	Private landowners	Permanent protection of bushland with high nature conservation values through the placement of a legally binding covenant on their land title. Administration, survey, legal and covenant registration costs Fencing and other management costs Eligibility for funding or rate relief may apply on a case by case basis through other programs	Case-by-case basis Up to $500 to cover the owner's reasonable independent legal costs Up to $10,000 for initial implementation of management actions	Ongoing	Nature Conservation Covenant Program Coordinator (08) 9334 0477 www.dec.wa.gov.au/management-and-protection/conservation-on-other-lands/covenant-program.html	State-wide
Strategic Priority Project Grants, State NRM Program	Regional NRM groups, state government agencies and the Western Australian Local Government Association	Projects that address State NRM Program investment priorities	$10-$15 million in total	Varies	State NRM Office www.nrm.wa.gov.au/grants/state-nrm-program.aspx	State-wide
Swan Alcoa Landcare Program (SALP), Perth Region NRM Inc	Community groups and local governments working with community groups within the Swan and Canning catchments	On-ground works to protect surface and groundwater and biodiversity			Perth Region NRM (08) 9374 3333 enquiries@perthregionnrm.com www.perthregionnrm.com/pr-nrm-programs/swan-river-trust-alcoa-landcare-program.aspx	The catchments of the Swan and Canning Rivers
Water grants and funding, Australian Government	Action on climate change; wise water use; securing water supplies; healthy rivers and waterways	Varies	Varies	Varies	www.environment.gov.au/water/programs/index.html	National

Funding directories

There are many funding directories and websites providing details of funding for a range of environmental projects and activities. The following are links to some of the most comprehensive grant directories and websites that can be used to identify funding and grants programs for wetland protection and management activities.

Table 2. Funding directories useful for sourcing funds for wetland management.

Funding directory	Directory provider	Contact
DAFF grants and assistance	Department of Agriculture, Fisheries and Forestry (DAFF)	www.daff.gov.au/about/current-grants
DSEWCaP grants and funding	Department of Sustainability, Environment, Water, Population and Communities (DSEWCaP)	www.environment.gov.au/about/programs/index.html
EasyGrants newsletter	Our Community (note: there is a subscription fee)	www.ourcommunity.com.au/funding/funding_main.jsp
Grants Directory	Department of Local Government and Regional Development	http://grantsdirectory.dlg.wa.gov.au www.rdl.wa.gov.au/grantandfunding/FundingApplications/Pages/default.aspx
GrantsLINK	Department of Regional Australia, Local Government, Arts and Sport	http://grants.myregion.gov.au
Guide to Community Grants	Parliament of Australia Parliamentary Library	www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/Browse_by_Topic/community
WA Government	Government of Western Australia	http://wa.gov.au/information-about/wa-government/awards-grants-rebates

Labour programs

There are a variety of labour programs that can provide private landowners and local governments with labour, tools and other resources required to undertake bushland and wetland management activities.

Table 3. Labour programs available in Western Australia

Labour program	Who is targeted	What the program provides	For further information	Geographic Spread
Better Earth, Conservation Volunteers Australia	Community groups Park rangers Landcare coordinators Environmental officers Park maintenance staff	Provides a managed volunteer task force under the supervision of a fully trained team leader.	Free call 1800 032 501 (08) 9335 2777 perth@conservationvolunteers.com.au www.conservationvolunteers.com.au	State-wide
Earth Assist, Conservation Volunteers Australia		Supervised volunteering of students in years 10 to 12	(08) 9335 2777 perth@conservationvolunteers.com.au www.conservationvolunteers.com.au/about-us/our-partnerships/rio-tinto-earth-assist	State-wide
Employment Services, Green Skills Inc (Ecojobs)	Environmental projects	Provides skilled environmental personnel for natural resource management contracts and paid casual employment.	Annabelle Newbury (08) 9360 6667 anewbury@greenskills.org.au. ecojobs@greenskills.org.au www.greenskills.org.au	Perth metropolitan area South Coast NRM Region
Green Corps, Greening Australia WA	Resource management organisations Catchment groups Indigenous organisations/ corporations Local councils and shires	Greening Australia delivers the national Green Corps training initiative for the Federal Government's Department of Education, Employment and Workplace Relations (DEEWR).	Claire Hudson (08) 9335 0120, (08) 6488 6699 chudson@gawa.org.au.	State-wide rural and remote areas (excluding Rangelands NRM Region)

Land sale, purchase or donation

For some private landholders, managing bushland on their property is a difficult and/or unwanted task. For these landowners, selling their bushland is an attractive alternative. There are a number of programs operating in WA that can facilitate the sale of bushland to conservation-minded members of the public. In some circumstances, government agencies also have funding to purchase bushland considered to be of high conservation value. For some landholders, the option of donating bushland to an organisation is also attractive, particularly if there is an economic incentive to do so (such as taxation benefits).

Table 4. Land sale, purchase and donation programs available to facilitate the sale of bushland for conservation management.

Program	Land sale, purchase or donation	Who is eligible/supported	What the program provides	For further information	Geographic Spread
Bush Heritage Australia	Land purchase	Private landowners Indigenous groups Pastoral lessees	Acquires and manages land of high conservation value and works in partnership with other landowners Manage fire, feral animals and weeds	1300 NATURE (1300 628 873) info@bushheritage.org.au www.bushheritage.org.au	State-wide
Bush Brokers: WWF-Australia, Real Estate Institute of Western Australia (REIWA), and the National Trust of Australia (WA	Purchase and land sale	Landowners Conservation-minded groups and individuals	Aims to promote the sale of bushland as a real estate asset, and thus increase the financial and conservation values of bush blocks in south-west Western Australia to ensure their conservation and sustainable use	info@bushbrokers.com WWF Australia (08) 9387 6444 REIWA on (08) 9755 5123 Natural Heritage Manager at National Trust of Australia (WA) (08) 9321 6088 www.bushbrokers.com.au	State-wide
Government Conservation Land Purchase Program, Department of Environment and Conservation	Purchase of leasehold land Purchase of parcels of freehold remnant vegetation and wetlands in the south-west agricultural zone and Swan Coastal Plain	Landowners Pastoral lessees	Acquires land suitable for establishing a comprehensive, adequate and representative terrestrial conservation reserve system	DEC's Land Tenure Project Officer (08) 9219 8775	State-wide
Land purchasing, Gondwana Link	Land purchase Covenanting	Private landholders	Aims to restore the ecological connectivity between the forests and the semi-arid interior of south-western Australia by building a network of core wilderness areas linked by continuous belts of habitat surrounded by appropriate land uses.	Gondwana Link Director (08) 9842 0002. www.gondwanalink.org	South Coast NRM region
Land Purchasing/Tax Deductable Donation, Australian Wildlife Conservancy (AWC)	Land purchase Donation	Landowners Pastoral lessees	Aims to establish a national network of sanctuaries that protect threatened wildlife and ecosystems by acquiring and managing areas of high conservation significance. AWC's operations are funded primarily by donations.	Australian Wildlife Conservancy (08) 9380 9633 www.australianwildlife.org	State-wide

Program	Land sale, purchase or donation	Who is eligible/supported	What the program provides	For further information	Geographic Spread
Tax deductible donation, National Trust of Australia (WA)	Donation	Government Environmental organisations Private landowners	Land can be donated to the National Trust of Australia (WA) and the donor may be eligible for a tax deduction. Land may subsequently vested in an approved environmental organisation or government conservation department to ensure it is managed for conservation.	National Trust WA Natural Heritage Manager (08) 9321 6088 www.naturalheritage.org.au	State-wide

Legal protection

As with management agreements, legal protection mechanisms will be more appealing to those landholders who are already conservation-minded. The following covenanting programs offer voluntary, legal agreements that can aid in the protection of bushland from future development. Most of the programs outlined below enable landholders to gain access to professional advice and financial incentives.

Table 5. Legal protection mechanisms available to facilitate the protection of bushland.

Program	Who is eligible/ supported	What the program provides	For further information	Geographic Spread
Covenanting Program, National Trust of Australia (WA)	Private landowners	National Trust covenants can be tailored to meet the landowner's needs. They are legally binding and run with the title of the land in perpetuity, although fixed-term covenants are negotiable. Management advice through program. Eligibility for funding or rate relief may apply through other programs on a case by case basis.	National Trust WA Natural Heritage Manager (08) 9321 6088 www.nationaltrust.org.au/wa/natural-heritage	State-wide
Nature Conservation Covenant Program, DEC	Private landowners	Enables landowners to permanently protect their bushland with high nature conservation values through the placement of a legally binding covenant on their land title. Advice, stewardship support and management funding through program. Eligibility for other funding or rate relief programs may apply on a case by case basis.	Nature Conservation Covenant Program Coordinator (08) 9334 0477 www.dec.wa.gov.au/management-and-protection/conservation-on-other-lands/covenant-program.html	State-wide
Soil and Land Conservation Act Covenant, Department of Agriculture and Food	Private landowners	Two types of conservation covenants are available to protect land and can apply for an agreed period or in perpetuity.	Office of the Commissioner of Soil and Land Conservation at the Department of Agriculture and Food (08) 9368 3282 www.agric.wa.gov.au/PC_93234.html	State-wide

Management agreements

Management agreements will be most attractive to those landholders who are already conservation minded. These agreements often take the form of voluntary, legal or non-binding agreements that can aid in the protection of bushland from future development. Most programs enable landholders to gain access to professional advice and financial incentives that they would otherwise not be eligible to receive.

Table 6. Management agreements available to facilitate the protection of bushland.

Program	Who is eligible/ supported	What does the program provide	For further information	Geographic Spread
Conservation and Land Management Act Section 16, DEC	Private landowners or lessees	DEC may enter into an agreement with a landowner or lessee to manage the land under the CALM Act, usually where the land is adjacent to other land managed by DEC, and the agreement to manage is a means of more efficiently managing the combined land area. Management agreements might also be considered where DEC has a significant interest in the land, such as the occurrence of a significant area of vegetation, and the land owner or occupier was not wishing to manage those interests.	Contact your local DEC office; see Table 8. 'DEC Regional Headquarters' below.	State-wide
Healthy Wetland Habitats, DEC	Private landowners	Development of a voluntary management agreement for priority actions Technical and financial support	Healthy Wetland Habitats Coordinator on (08) 9219 8788 www.dec.wa.gov.au/hwh hwh@dec.wa.gov.au	Jurien-Dunsborough, including Perth metropolitan area
Land for Wildlife, DEC	Private landowners	Assistance with management plans Technical support	Land for Wildlife Coordinator (08) 9334 0530 www.dec.wa.gov.au/landforwildlife	State-wide

TRAINING

This section provides an overview of the key wetland-related training opportunities available in WA. The following training programs range from general wetland management to rehabilitation techniques. Training programs also provide opportunities for information exchange and networking between like-minded people. Training opportunities have been listed in alphabetical order by the name of training provider. University courses are not listed.

Table 7. Training providers and training opportunities available to wetland managers.

*Please note contact names may change and therefore in some instances only position titles and contact details are given.

Host agency	Training opportunity	Target audience	Contact details
Cockburn Wetlands Education Centre	Occasional training and events can be provided.	Open	www.cockburnwetlands.org.au Contact person: Wetlands Officer 9417 8460
DEC and Southern Cross University	Annual acid sulfate soils professional short course; acid sulfate soil identification, assessment and management. Held in WA and other states.	Environmental consultants, urban developers, contractors, environmental scientists and conservationists, civil and environmental engineers and resource industry professionals	Chrisy Clay, Southern Cross University, Lismore NSW (02) 6620 3095 chrisy.clay@scu.edu.au; www.scu.edu.au/geoscience Acid sulfate soils section, DEC; Manager Stephen Wong (08) 9333 7576
DEC EcoEducation Program	Offers schools, teachers, students and their communities a variety of products and services to generate interest in and action for biodiversity conservation, sustainable living and practical ways to act on conservation issues.	School students	www.dec.wa.gov.au/ecoeducation
DEC Land for Wildlife Program	Workshops or field days are arranged when registered landholders express an interest in learning more about a particular topic, for example 'native plant propagation' or 'acid sulfate soils'. These events are usually also open to the general public.	Open	Senior Project Officer (08) 9334 0427
DEC Ribbons of Blue Program	Provides teachers and their students with practical, hands-on learning experiences focussing on the sustainability of local waterways, wetlands and their ecosystems. Ribbons of Blue has loan equipment and sampling procedures to enable community groups to monitor wetland condition.	School students	Coordinator (08) 6467 5127 http://education.dec.wa.gov.au/ribbons-of-blue.html
DEC Urban Nature Program	Provides field days, workshops, training programs, technical advice and on-ground support for land managers working to protect, manage and restore bushland and wetland in DEC's Swan Region and beyond.	Open	(08) 9423 2900 urban.nature@dec.wa.gov.au
Eastern Metropolitan Regional Council's Bush Skills for the Hills	Bush Skills for the Hills is a series of free, hills-focused workshops for the community. The workshops are a mix of information and practical hands-on sessions designed to give participants both the 'why' and 'how' of managing land, bush and creeks in the hills environment.	Open	www.emrc.org.au/bush-skills-for-the-hills-workshops.html

Host agency	Training opportunity	Target audience	Contact details
Greening Australia WA	Greening Australia WA provides environmental education and training in seed collection and rehabilitation methods.		(08) 6488 6699 general@gawa.org.au
Green Skills Inc.	A Registered Training Organisation scoped to deliver: Conservation and Land Management Traineeships Certificates I – IV in Conservation & Land Management Bushland and wetland management workshops	Eligible applicants	State Manager Training (08) 9360 6667 www.greenskills.org.au anewbury@greenskills.org.au
National centre for groundwater research and training	Groundwater short courses, generalist courses and specialist courses offered in WA and other states	Professional development for NRM practitioners	To subscribe to training emails: cgs@groundwater.com.au (08) 8201 5632 www.groundwater.com.au
Piney Lakes Environmental Education Centre	Workshops and self-guided activities	Community and teacher professional development	www.melvillecity.com.au/pineylakes
Regional NRM organisations	Regional NRM organisations may hold various training events for landholders and community groups at various times.	Varies	Contact your local NRM Region office; see Table 9 below.
Rockingham Regional Environment Centre (Naregebup)	Various educational opportunities including an education program for school students and school holiday program.	Varies	www.naragebup.org.au
Small landholder information service	Provides targeted learning events and resources on sustainable land management.	Landholders of small properties	small_landholder@agric.wa.gov.au www.agric.wa.gov.au/PC_92609.html
Sydney Olympic Park Authority	Wetland Education and Training (WET) Program is for wetland management and policy professionals and academics.		(02) 9714 7888 To subscribe: wetworkshop@sopa.nsw.gov.au
TAFE WA	Various units and courses such as Environmental Science - Management (Cert IV & Diploma).	Tertiary students	www.trainingwa.wa.gov.au/trainingcourses/detcms/portal/
WA Gould League	Environmental education based at Herdsman Lake Wildlife Centre.	Community and school students	www.wagouldleague.com.au
Wildflower Society of Western Australia	The Wildflower Society often conducts information talks for a small cost.	Open	http://members.ozemail.com.au/~wildflowers/events.htm

RESOURCES

This section provides an overview of key resources including:

- conferences and other activities
- DEC information centre
- general contacts and sources of advice
- technical advice
- wetland mapping
- online data sources with information about WA's wetlands
- websites and newsletters

Conferences and other activities

World Wetlands Day: World Wetlands Day is celebrated internationally each year on 2 February. It marks the anniversary of the signing of the Convention on Wetlands of International Importance (Ramsar Convention) in Ramsar, Iran, on 2 February 1971. In celebration of World Wetlands Day, state governments, community organisations and non-government organisations hold various activities across the country. For more information see www.environment.gov.au/water/topics/wetlands/world-wetlands-day/index.html and www.dec.wa.gov.au/management-and-protection/wetlands/internationally-recognized-wetlands-ramsar.html

Annual WA Wetland Management Conference: the Cockburn Wetlands Education Centre holds a conference annually on/close to 2 February each year, marking World Wetlands Day. The conference provides an annual opportunity to exchange information and ideas between wetland practitioners, with a focus on the latest developments about how to effectively manage and restore wetlands. For more information see http://cockburnwetlandscentre.wordpress.com/

DEC Information Centre

Visitors to DEC's Information Centre have access to a wide range of library resources suitable for professionals, teachers, students, community groups and the general public. These can be viewed at the DEC Information Centre, located at The Atrium, Level 4, 168 St Georges Terrace, Perth WA 6000 (08) 6467 5226. For more information, see

www.dec.wa.gov.au/about-us/about-dec/3369-information-centre.html.

To search the DEC Conservation Library catalogue, see http://science.dec.wa.gov.au/conslib.php. Loans and article copies are available through the interlibrary loan/document delivery service provided by institutional and public libraries.

General contacts and sources of advice

DEC regions

The following table contains the current contact details for DEC regional headquarters. People can be directed to the appropriate district office, work centre or DEC officer through these contacts. WA DEC Regions are shown in Figure 2. Note that these details can change, see www.dec.wa.gov.au/index.php?option=com_content&view=article&id=6518&Itemid=1563 for current listings.

Table 8. DEC regional headquarters and phone numbers

DEC regions and regional headquarters	Phone number
Atrium (central administration)	(08) 6467 5000
Goldfields Region, Kalgoorlie	(08) 9080 5555
Kimberley Region, Kununurra	(08) 9168 4200
Midwest Region, Geraldton	(08) 9921 5955
Pilbara Region, Karratha	(08) 9143 1488
South Coast Region, Albany	(08) 9842 4500
South West Region, Bunbury	(08) 9725 4300
Swan Region, Bentley	(08) 9423 2900
Warren Region, Manjimup	(08) 9771 7988
Wheatbelt Region, Narrogin	(08) 9881 9222

Figure 2. Boundaries of DEC regions and locations of regional headquarters.

Regional NRM organisations

Regional natural resource management (NRM) organisations coordinate a range of resources and information relevant to wetlands. Regional NRM organisations can provide assistance and details of relevant sub-regional organisations. They are outlined in Table 9 and the boundaries are shown in Figure 3.

Table 9. Regional NRM organisation contacts

NRM regional organisation	NRM Sub-regions
Northern Agricultural Catchments Council www.nacc.com.au (08) 9938 0100	Greenough Moore River West Midlands Yarra Yarra
Perth Region NRM www.perthregionnrm.com (08) 9374 3333	North North-East East South Coastal
Rangelands NRM WA www.rangelandswa.com.au (08) 9485 8930	Kimberley Pilbara Gascoyne-Murchison Goldfields-Nullarbor
South Coast Natural Resource Management Inc. www.southcoastnrm.com.au (08) 9845 8537	Albany Hinterland Esperance Mallee Esperance Sandplain Fitzgerald Biosphere Kent Frankland North Stirlings Pallinup
South West Catchments Council www.swccnrm.org.au (08) 9780 6193	Blackwood Cape to Cape Geographe Leschenault Peel-Harvey Warren
Wheatbelt NRM www.wheatbeltnrm.org.au (08) 9670 3100	Avon Lockhart Yilgarn

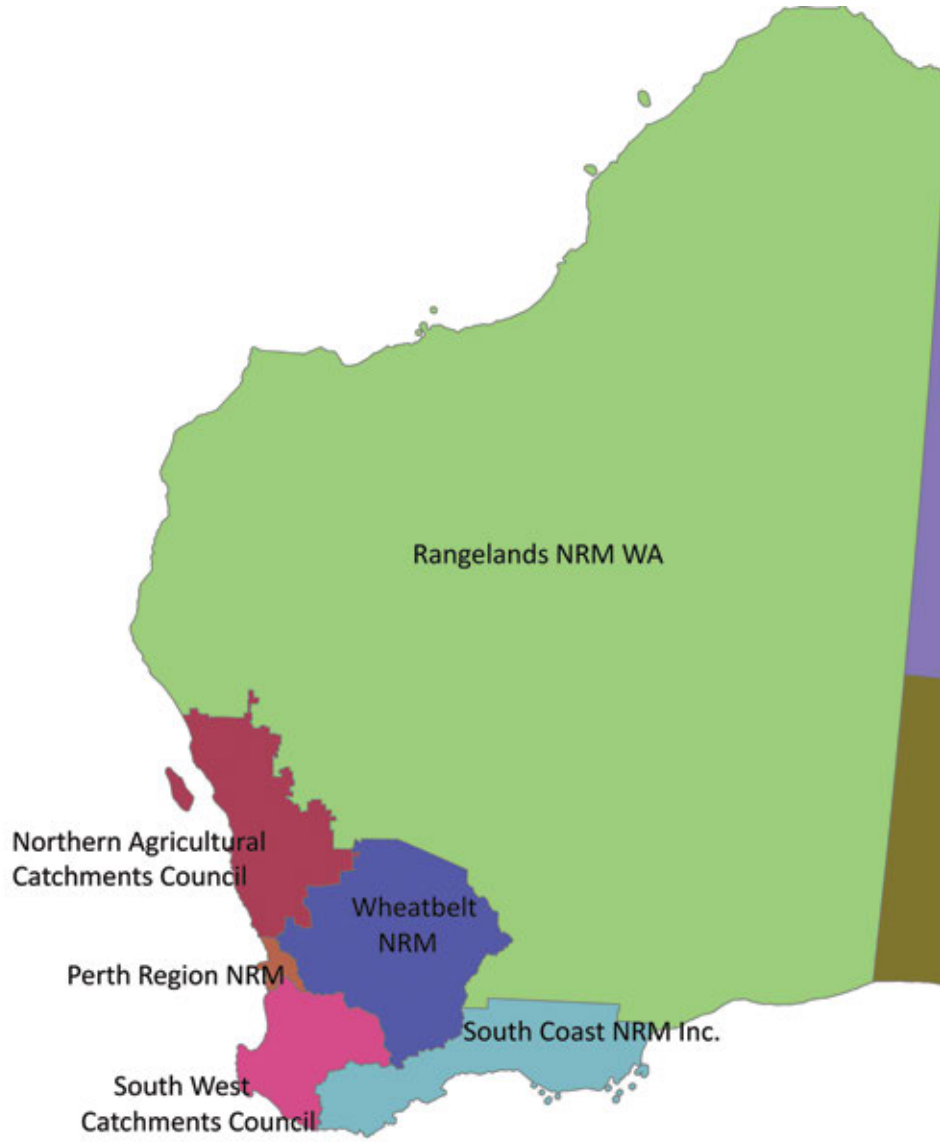

Figure 3. Regional NRM organisation boundaries

Local Government

The Western Australian Local Government Association (WALGA) is a non-government organisation that lobbies and negotiates on behalf of the 142 local governments of WA: http://walga.asn.au

It also provides a list of all of WA's local government websites: http://walga.asn.au/AboutLocalGovernment/CouncilWebsites.aspx

Environment centres

Western Australia's environmental education centres are very important and greatly increase community awareness and the capacity of individuals to make decisions and implement positive management actions for wetlands on their property, or the public properties they are involved in managing through Friends-of groups or other associations.

Education centres that incorporate nearby wetlands into their activities include:

- Canning River Eco Education Centre: www.canning.wa.gov.au
- Cockburn Wetlands Education Centre: www.cockburnwetlands.org.au
- Henderson Environment Centre: www.stirling.wa.gov.au
- Herdsman Lake Wildlife Centre (WA Gould League Inc): www.wagouldleague.com.au
- Naragebup Rockingham Environment Centre: www.naragebup.org.au
- Piney Lakes Environmental Education Centre: www.melvillecity.com.au
- South West Environment Centre: www.swecwa.org

Volunteering

Volunteering WA www.volunteeringwa.org.au

Technical advice and expertise

The following programs can provide landholders and community groups with technical advice in order to gain an understanding of wetlands on their land and the management practices they need to employ to protect them. The programs outlined below currently deliver technical assistance through a variety of mechanisms ranging from education materials to one-on-one advice from trained staff.

Table 10. Programs available to provide technical advice on wetland management

Program	Who is eligible/ supported	Advice provided	For further information	Geographic spread
Bush Brokers. World Wildlife Fund (WWF) Australia, Real Estate Institute of Western Australia (REIWA), and the National Trust of Australia (WA)	Conservation-minded groups and individuals Buyers and sellers of bush	Manual for buyers, sellers and realtors Checklist and information brochures for buyers and sellers of bush Case study documents	info@bushbrokers.com WWF Australia (08) 9387 6444 REIWA (08) 9755 5123 Natural Heritage Manager at National Trust of Australia (WA) (08) 9321 6088 www.bushbrokers.com.au	State-wide
Environmental Defenders Office (WA) Inc.	Community groups and individuals who cannot otherwise afford assistance	Legal advice and representation on public interest environmental law issues	Environmental Defenders Office (WA) Inc. (08) 9221 3030, 1 800 175 542 edowa@edowa.org.au www.edowa.org.au	State-wide
Healthy Wetland Habitats, DEC	Private landholders	Wetland management advice	Healthy Wetlands Coordinator (08) 9219 8788 www.dec.wa.gov.au/hwh hwh@dec.wa.gov.au	Jurien-Dunsborough, including Perth metropolitan area
Land for Wildlife, DEC	Private landholders	Bushland and wetland management advice	DEC Land for Wildlife Senior Project Officer (08) 9334 0427 www.dec.wa.gov.au/landforwildlife	State-wide

Program	Who is eligible/ supported	Advice provided	For further information	Geographic spread
Seed Management Services, Greening Australia WA	Commercial service to clients in government, industry, the private sector and community	Direct technical advice and training on best practice seed collection and rehabilitation methods Advice on suitable native species Technical advice on revegetation planning and direct seeding	Seed Management Services Co-ordinator (08) 9335 8933 bsmith@gawa.org.au	State-wide
Urban Nature, DEC	Land managers, associated community groups	Technical advice relating to wetland and bushland management	Urban Nature Coordinator (08) 9423 2900 urban.nature@dec.wa.gov.au.	DEC's Swan Region and beyond
Wetlands Section, DEC	Land managers Community groups	Advice on managing wetlands	wetlands@dec.wa.gov.au	State-wide

Wetland mapping

Wetland mapping has been undertaken, to varying degrees, in some regions of WA (Figure 4). Mapping scale and type of information collected varies with each project but ranges from 1:25,000 to 1:250,000 and information may include wetland location, boundary, type and values. Additional mapping projects, particularly in the midwest and south-west, are in development. As mapping projects are finalised, datasets containing this information are made publicly available. Public access for viewing and downloading datasets is outlined in the next section 'Online data sources with information on WA's wetlands'. For more information about wetland mapping in WA, see the topic 'Introduction to the guide'.

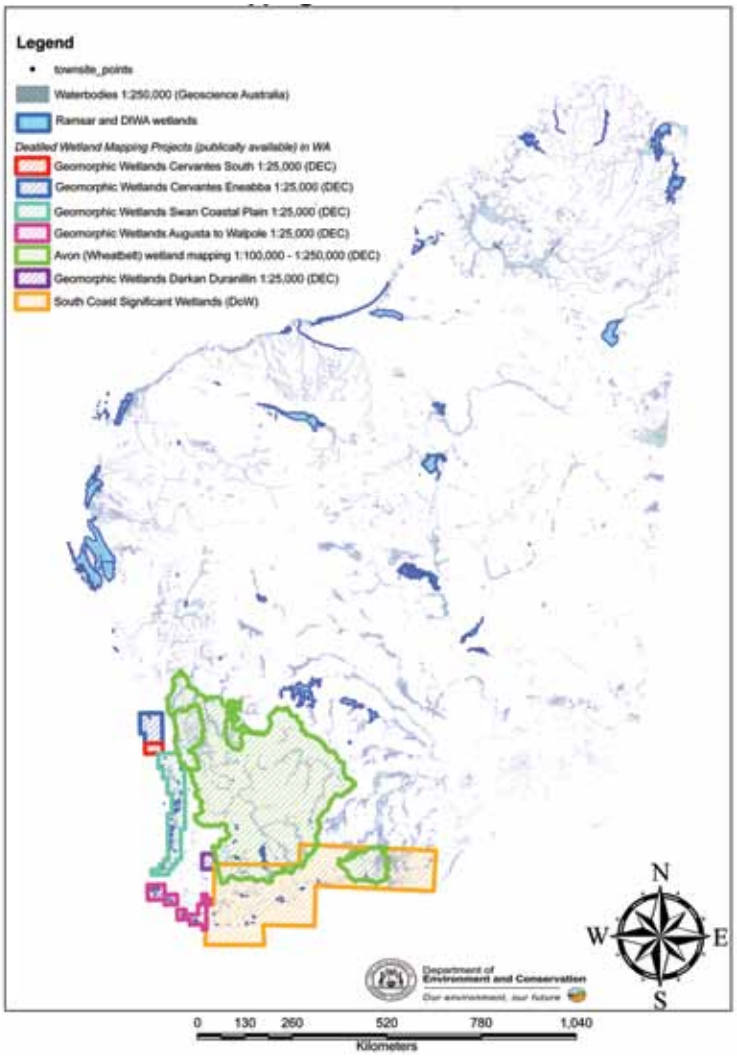

Figure 4. Areas of WA where wetlands have been mapped. Image – Wetlands Section/DEC.

Online data sources with information on WA's wetlands

The Australian Wetlands Database provides online access to information on internationally important wetlands, that is, Australia's Ramsar wetlands; and nationally important wetlands, that is, sites listed in the online directory of important wetlands of Australia. http://environment.gov.au/water/topics/wetlands/database/index.html

Landgate's WA Atlas is a basic map viewer enabling users to see what WA data is available and to do some simple mapping functions. The following wetland datasets are available via https://www2.landgate.wa.gov.au/slip/portal/home/home.html:

- *Geomorphic Wetlands Swan Coastal Plain* dataset
- *Geomorphic Wetlands Augusta to Walpole* dataset
- *South Coast Significant Wetlands* dataset
- *Ramsar Sites Western Australia* dataset
- *Lakes Environmental Protection Policy* dataset
- *South West Agricultural Zone Wetlands Environmental Protection Policy* dataset

It also provides cadastral information (for example, property boundaries and numbers).

For information and instructions on how to view these datasets go to: www.dec.wa.gov.au/management-and-protection/wetlands/wetlands-mapping.html. Additional mapping projects, particularly in the midwest and south-west, are in development. As mapping projects are finalised, datasets containing this information are made publicly available.

DEC's **NatureMap** enables users to produce maps, lists and reports of WA's flora and fauna diversity. Wheatbelt wetland mapping is also available on NatureMap. http://naturemap.dec.wa.gov.au/

DEC's **WetlandBase** is an interactive database by DEC, with web hosting by the Department of Agriculture and Food WA, available via www.dec.wa.gov.au/management-and-protection/wetlands/wetlands-data/wetlandbase.html or via http://spatial.agric.wa.gov.au/wetlands. *WetlandBase* provides a comprehensive online resource of information and data about Western Australian wetlands. It provides spatial data, such as wetland mapping, and point data, such as water chemistry, waterbirds, aquatic invertebrates and vegetation sampling results. DEC is preparing an alternative to *WetlandBase*, scheduled for release in 2013, that will continue to make this data publicly available.

Google Earth enables viewing of aerial photography and, where available, aerial photography over time (time series) www.google.com/earth.

Landgate's **Map Viewer** enables viewing of aerial photography and, where available, aerial photography over time (time series). It also provides cadastral information (for example, property boundaries and numbers). https://www.landgate.wa.gov.au/bmvf/app/mapviewer/

Websites and newsletters

ASSAY (acid sulfate soil newsletter) is provided by the NSW Department of Primary Industries and funded by the Australian Government. To subscribe contact Simon Walsh simon.walsh@dpi.nsw.gov.au or see www.dpi.nsw.gov.au/aboutus/resources/periodicals/newsletters/assay.

Australian Society for Limnology (ASL) is a professional association for scientists and managers of inland waters, including rivers, streams, lakes, reservoirs and estuaries. See www.asl.org.au

Bushland news is the newsletter of DEC's Urban Nature Program, produced quarterly to support community involvement in bushland conservation. To subscribe, email urban.nature@dec.wa.gov.au. Current and archived issues are available at www.dec.wa.gov.au/management-and-protection/programs/urban-nature/bushland-news.html

COOEEads provides a weekly email listing of jobs, conferences and training opportunities in the outdoor education/ recreation; environmental education/extension; and conservation/park management fields in Australia and New Zealand. To subscribe visit www.cooeeads.com.au.

DEC wetlands webpage www.dec.wa.gov.au/wetlands provides information on WA's wetlands and details of DEC programs.

DSEWCaP wetlands webpage http://environment.gov.au/water/topics/wetlands/index.html provides information on Australia's wetlands and details of the Australian Department of Environment, Sustainability, Water, Communities and Population programs.

Small Landholder Information Service (AgWA) provides a specialised website for landholders wishing to manage land sustainably. To subscribe see www.agric.wa.gov.au/PC_92609.html

WATSNU newsletter by DEC is a newsletter about the conservation of WA's threatened species and ecological communities, many of which are wetlands. To subscribe, email Gemma.Grigg@dec.wa.gov.au or Jill.Pryde@dec.wa.gov.au. For current and archived issues see www.dec.wa.gov.au/management-and-protection/threatened-species/watsnu-newsletters.html

WetlandCare Australia (WCA) is a national not-for-profit, non-government science-based organisation with a mission to support the community in the protection and repair of Australia's wetlands through action-based partnerships with governments, landholders, natural resource managers, researchers and the community www.wetlandcare.com.au. Their email bulletin is WetlandLink, subscribe from www.wetlandcare.com.au/index.php/news/wetlandlink-newsletter

Wetlands Australia magazine is a twice-yearly publication by the Department of Sustainability, Environment, Water, Population and Communities. It brings together information and resources from across Australia relating to wetlands conservation, management and education. To subscribe and for current and archived issues go to http://environment.gov.au/water/publications/environmental/wetlands/wetlands-australia/index.html