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# WESTERN AUSTRALIAN HERBARIUM

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SCIENCE DIVISION

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT



**W**estern Australia has an exceptionally rich array of biota, ecosystems and habitats. Over 12,500 kinds of vascular plant have been discovered in the state's 2.5 million square kilometres and more than 60% of the species are endemic to WA.

The south western part of the state is internationally recognised for its flowering plant diversity. This province alone is home to over 7,000 kinds of vascular plant.

The Western Australian Herbarium is an integral part of the Department of Conservation and Land Management. It is responsible for the description and documentation of Western Australia's botanical species diversity.

## Biodiversity Collections

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Our collections document the biodiversity of native and alien plants of Western Australia. 500,000 specimens include vascular plants, bryophytes, lichens, macro-fungi, marine and fresh water algae, as well as collections of micro-organisms of particular significance to conservation, agriculture and public health such as water moulds, Cyanobacteria, Actinobacteria.

## Biosystematics

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Biosystematics is the platform from which all biology advances. It provides the scientific basis for the understanding and ordering of taxonomic biodiversity by recognising species, classifying them into related groups and discerning their evolutionary history. The WA Herbarium includes a molecular genetics facility to extend its systematic research using the latest methods.

Current research elucidates the systematics of major plant groups, threatened species and those of economic importance as well as producing identification applications and manuals. The WA Herbarium also publishes the taxonomic journal *Nuytsia* and has



*Banksia coccinea*

produced a series of comprehensive regional floras. By establishing the names and relationships of plants and understanding their genetic systems and population dynamics we can:

- analyse evolutionary patterns and the delimitation and characterisation of species
- identify species at risk as well as targets for guided general and biodiscovery collecting
- highlight potential weed threats

## Conservation Biology

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Staff at the WA Herbarium survey, assess the conservation status and prepare area-based management plans for rare and threatened flora. This work is complemented by the *Threatened Flora Seed Centre* and integrated biological studies on critically endangered and other threatened plants.

To advise and assist in the conservation and recovery of these species we provide baseline data on:

- their ecology, life-history and seed biology
- the long term storage and collection of genetically representative seed
- genetic diversity patterns & mating systems
- re-introduction methodologies



# WEED INFORMATION NETWORK

## What is it

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The Weed Information Network (WIN) is a new Natural Heritage Trust supported initiative for the Western Australian Herbarium that over the next two years will develop a comprehensive weed-watch program and online information system for the State.

The Weed Information Network aims to become the primary authoritative information resource concerning the state's weed species. WIN is designed to integrate closely with the Regional Herbaria Network to focus local communities across the state on the problem of destructive invasive species.

Information products created as outcomes from the WIN project will be disseminated via the FloraBase web site.

*Volunteers from local community conservation groups locate, document and collect voucher specimens of weeds for their regional herbarium*

## Why is it important

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Weeds cause serious economic loss for agriculture and damage to the environment of natural areas. Good information is the first requirement for tackling the problems.

It is uncertain how many weed species occur in Western Australia because of poor information. Estimates range from 800 to over 1000 species. The WIN project is re-assessing the evidence.

Additionally, the actual identity of many weed species is uncertain due to a lack of expert identifications. WIN project botanists and cooperating international experts will review the identity of Western Australian weeds.

Specimens provide the physical evidence for the presence, distribution and identity of weeds. The WIN project will train and mobilise the many volunteers of the Regional Herbaria Network to collect good specimens with quality data from numerous locations across Western Australia.

## The user community

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A wide range of conservation practitioners in government and the community require authoritative information on the identification, propagation and control of invasive species.

Community groups forming the Regional Herbaria Network will be increasing their efforts in documenting local and regional weed species and will require the latest available information on weeds.

## Sponsorship opportunities

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The Weed Information Network (WIN) has recently obtained National Heritage Trust (NHT) funding establishing the basic frame-work. Supplementary projects may include:

- digital images of weed species for presentation in online and printed information products
- a customised series of regional training workshops focusing on weed identification and advanced collecting techniques
- an encouragement scheme to reward excellent community participation with practical equipment or botanical book gifts



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# REGIONAL HERBARIA NETWORK

## What is it

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The Regional Herbaria Network actively links regional community groups to the Western Australian Herbarium, creating nodes of local expertise collaboratively contributing to an expanding knowledge base on the WA flora.

The Regional Herbaria Network trains community groups to collect and document specimens of their local native and weedy plant species. Specimens collected are sent to Perth for identification and retention, while another remains in the local reference herbarium, cross-referenced by a unique number.

By compiling a local reference herbarium with specimens for which the currency of names is ensured, a regional group can create a local conservation resource.

The community can access further available information on local plant biodiversity through tools such as the FloraBase web site.

## Why is it important

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Local knowledge from regional herbarium groups allows us to gather comprehensive information about local floras.

Regional collectors know their local habitats and can access areas a visiting botanist may miss, providing year-round observations to document the life stages and ecological preferences of local species.

To date, some 14,000 well-documented specimens have been added jointly to the State Collection and the Regional Herbaria. Approximately 15 new species have been discovered and 676 conservation species vouchered, including 78 rare species.

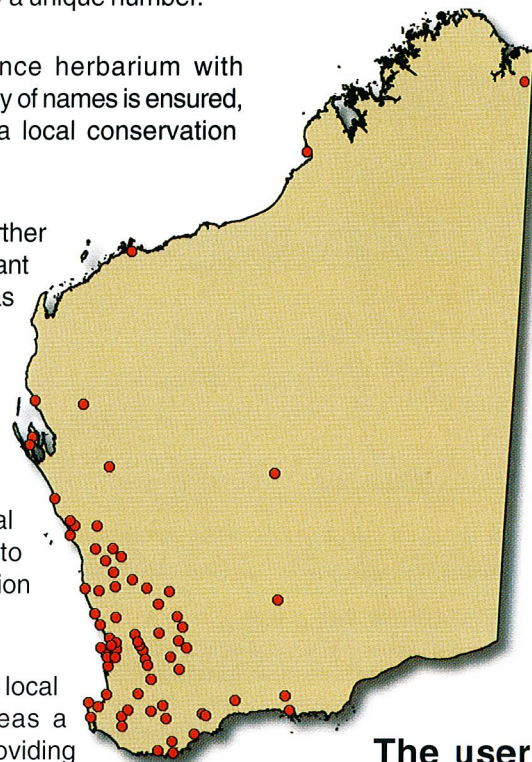
The recent initiation of the Weed Information Network will support regional collectors making important contributions towards documenting the distribution of invasive species throughout the State.

## Sponsorship opportunities

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The Gordon Reid Foundation and the Natural Heritage Trust (NHT) initially funded the Regional Herbaria Network. Ongoing funding is required to implement or support the following range of initiatives:

- additional personnel to coordinate training and support for the 74 regional herbaria
- a customised series of regional training workshops focusing on identification and advanced collecting techniques
- additional infrastructural support for regional herbaria, including collecting and mounting materials and library resources
- web programming and content for FloraBase customised to provide improved support for each Regional Herbarium
- publication of user-friendly flora-style booklets for regional areas based on the work of regional herbaria
- an enhanced plant identification service for Regional Herbaria



## The user community

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The Regional Herbaria Network serves an estimated 700 regional volunteers and the broader community with 74 regional groups throughout the State.

Regional Herbaria are empowered to create and maintain a local reference collection providing access to up-to-date information about the region's flora.

Local government agencies, community groups and education facilities can all benefit from interacting with their local Regional Herbarium.



## The user community

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Since the launch of FloraBase onto the web in 1998, well over 2,000 regular users have registered for access at one of the content levels provided. The user profile developed during this time is a varied one.

While a proportion of users continues to be drawn from within the state conservation agencies where it has become an indispensable tool for anyone working with our native flora, as many users access it from around the globe.

FloraBase is used widely at all three levels of the education sector for school projects, local planting days or tertiary training and research.

Many users of FloraBase work or volunteer in various community conservation efforts or are members of community groups that coordinate revegetation and rehabilitation projects.

Scientists and botanical consultants around Australia and elsewhere in the world consult FloraBase for information that would otherwise take many hours to research and compile.

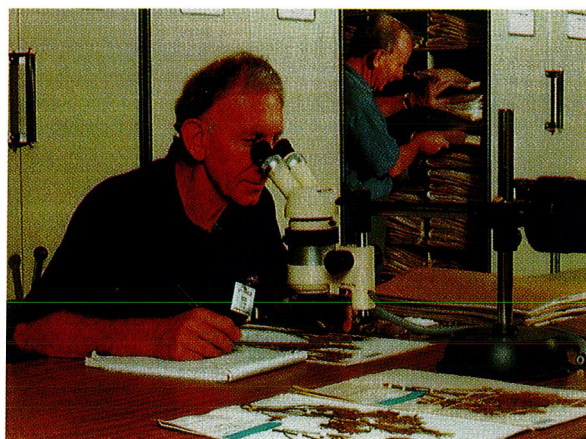
## Sponsorship opportunities

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FloraBase is modular in design and new content is constantly being added or prepared for release in forthcoming versions.

Projects developing modular content for FloraBase can be fast-tracked through appropriate sponsorship and include:

- more detailed descriptions of native species within particular taxonomic groups or regional ecosystems
- advanced information products for these target species groups such as interactive identification keys on CD, online as well as in print
- data capture for voucher specimens collected by community-based regional herbaria
- digitisation of existing regional flora management plans and interim recovery plans for publication on FloraBase



*Professional scientists, community groups and a wide cross-section of the education sector access the online information resource FloraBase*

- additional technical images illustrating for each species its appearance, life form and habitat, plus diagnostic features used in identification
- educational packages designed to help teachers and students achieve learning outcomes in the science, society and environment school curricula

Appropriate projects as suggested by potential sponsors will also be considered.

# FloraBase

Information on the Western Australian flora

## Contact details

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# FloraBase

Information on the Western Australian flora

## What is it

FloraBase is a state-wide electronic flora information system integrating a range of authoritative biodiversity datasets into a readily accessible web site.

A FloraBase query can provide a list of plants growing in a particular bio-region, the most up-to-date name for a native plant or weed, or a short description with a range map and a representative image.

FloraBase draws on databases holding information on all 500,000 specimens in the state's herbarium and 17,000 names used now and in the past for WA plants. Together with 12,000 databased descriptions and computer-generated maps plus over 2,500 species images, it forms the most comprehensive online botanical resource in Australia.

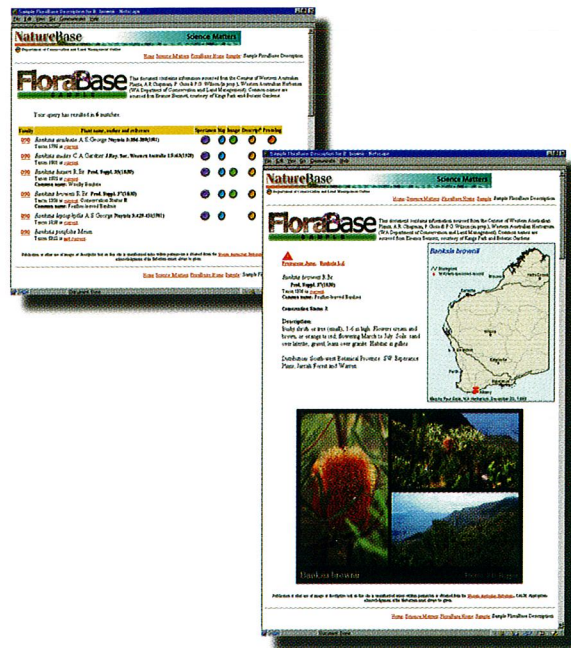
## Why is it important

Western Australia has a very diverse and unique flora. Almost one half of Australia's vascular flora grow in WA and nearly 80% are endemic to the state. Yet up to 20% are considered rare, threatened or have an uncertain conservation status.

With the growing community awareness of the needs for active conservation a reliable, up-to-date and readily accessible source of botanical information becomes essential.

All the resources and activities of the WA Herbarium are aimed at providing the latest scientific information with which to underpin the state's conservation effort.

Since 1998, FloraBase has become the primary method for the community to access this crucial botanical information.



Two examples of the FloraBase web site showing summary listing of plant names and further information available about each one, together with an example of a species page combining the available information for the rare *Banksia brownii*



*Astroloma epacridis*

New discoveries in the Western Australian flora are often made, necessitating an up-to-the-minute knowledge base for effective conservation and information dissemination on new or rare species

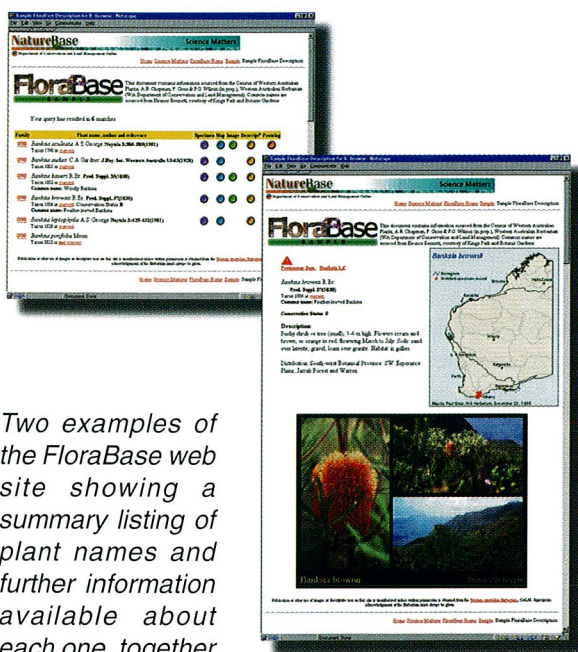


## Sponsorship opportunities

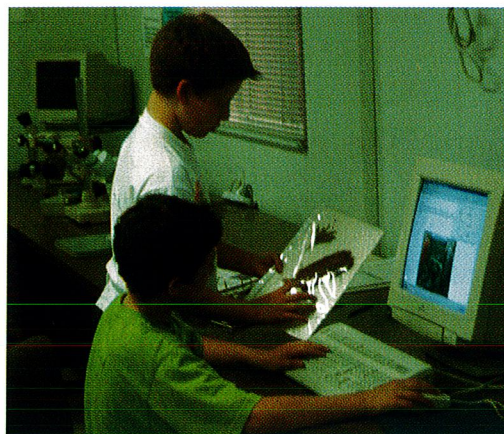
Teaching botany in schools can be assisted at a number of levels, from the provision of up-to-date general resources such as the FloraBase web-site to customised information packages.

Some suggested projects requiring sponsorship include the:

- development of general educational packages designed to help teachers and students achieve learning outcomes in the science, society and environment school curricula
- appointment of a skilled extension officer to work with the WA Herbarium and interested schools in preparing packages of printed and online information targeted towards environmental and biodiversity issues relevant to the schools local community
- support for interested schools with a specific interest in biodiversity conservation to set up a local regional herbarium for their community
- provision of materials and training to enable school groups to collect examples of local species for their local herbarium, together with images of the plants appearance and habitat for use in FloraBase



Two examples of the FloraBase web site showing a summary listing of plant names and further information available about each one, together with an example of a species page combining the available information for the rare *Banksia brownii*



*School children use their regional reference herbarium in concert with online information systems to better understand their local flora*

## The user community

The WA Herbarium, through its scientific publications and the Regional Herbaria and Weed Information Networks supports the WA community in a wide range of conservation efforts to document WA's native flora or coordinate revegetation and rehabilitation projects.

Since the launch of FloraBase onto the web in 1998, the WA Herbarium's information resources have become widely used at all three levels of the education sector for school projects, local planting courses or tertiary training and research.

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# BOTANY FOR SCHOOLS

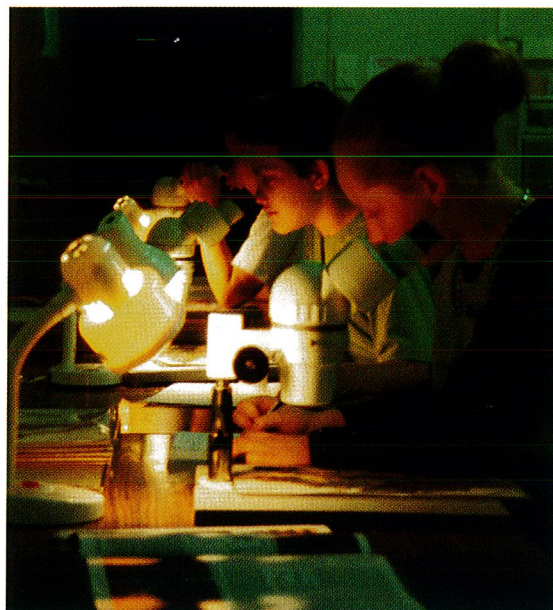
## What is it

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*Botany for Schools* is a new initiative from the Western Australian Herbarium which aims to provide customised learning opportunities for the state's education sector.

Backed by enormous information resources which already provide valuable scientific information to tertiary students and researchers around the world, the WA Herbarium is preparing to better address the demand from students and their teachers in secondary and primary schools.

Information with specific relevance to Western Australia can be refined from these resources and delivered by existing online information systems such as the FloraBase web-site, incorporated into a range of printed materials or packaged into interactive CD-ROMs.



*Students discovering the variation in plant structure between related Western Australian plant species*

## Why is it important

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Western Australia has a very diverse and unique flora. Almost one half of Australia's vascular flora grow in WA and nearly 80% are endemic to the state. Yet up to 20% are considered rare, threatened or have an uncertain conservation status.

With the growing community awareness of the needs for active conservation, a reliable, up-to-date and readily accessible source of botanical information becomes essential.

It is vital that the resources available to teach our school children about their world include reference to their local environments, the species they contain and how they interact with each other.

The WA Herbarium aims to provide both teachers and students with plant biodiversity information designed to meet the learning outcomes developed within the curriculum framework for primary and secondary schools.



*School classes often adopt local remnant bush to observe the natural environment, learn more about local species and help revegetate degraded areas*

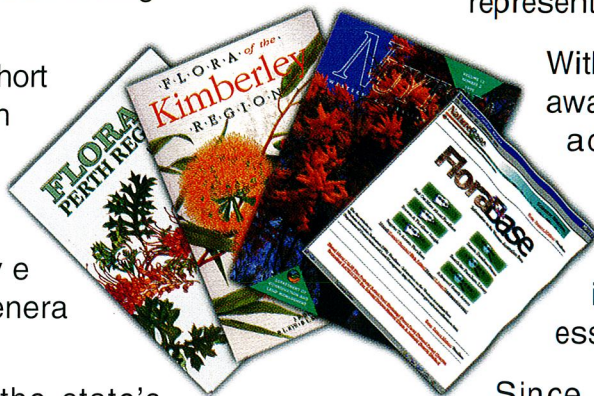


## Biodiversity Information Systems

A range of authoritative biodiversity data is managed using sophisticated information technologies.

This allows us to communicate the results of our science to a wide range of users involved in conservation—ecologists, agriculturalists, educators, decision makers and members of the general community. Amongst these systems are the:

- Census of WA Plants – the authoritative listing of native and alien plant names
- specimen database – ca 500,000 plant specimen labels vouchering scientific knowledge
- plant descriptions – a short description for each vascular plant species in WA, complemented by comprehensive descriptions of all genera and families
- botanical library – the state's collection of botanical books, journals and archival material
- plant images – a collection of digital photographs based on vouchered specimens



- spatial data derived from specimen label details and other sources allowing us to analyse and visualise patterns in the distribution of the state's plants
- biological attributes of plants – a new information system concerned with issues such as salinity, disease and fire response.

**FloraBase**, a state-wide electronic flora, integrates all of these datasets into a single easy-to-use web site.

A FloraBase query can provide a list of plants growing in a particular bio-region, the most up-to-date name for a native plant or weed, or a short description with a range map and a representative image.

With the growing community awareness of the needs for active conservation, a reliable, up-to-date and readily accessible source of botanical information becomes essential.

Since 1998, FloraBase has become the primary method for the community to access this crucial botanical information.

## Regional Herbaria Network

We support an extensive network of over 70 regional community groups to maintain local reference collections of duplicate specimens. The Regional Herbaria Network:

- trains volunteers to record detailed conservation data supported by voucher specimens
- contributes new documented specimens to the WA Herbarium collection and databases
- maintains the accuracy of identification and currency of naming for local reference collections by accessing FloraBase.



*Pileanthus peduncularis*



## Weed Information Network

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The Weed Information Network (WIN) is a new initiative backed by the Natural Heritage Trust that supports a comprehensive weed-watch program and provides an online weed information system for the state.

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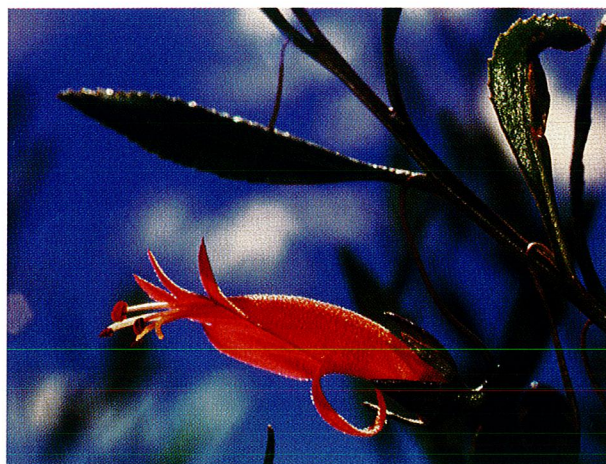
Information products created as outcomes from the WIN project will be disseminated via the FloraBase web site.

## Volunteer programs

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The WA Herbarium has an exciting and popular program to mobilise the efforts of city-based and regional volunteers. Current activities by 60 metropolitan volunteers and ca 500 volunteers in regional areas of the state are:

- specimen processing
- image capture and storage
- plant identification
- provision of plant information to the tourism industry
- regional herbaria network coordination
- contributions to the electronic flora
- collection, identification and documentation of invasive species
- curation and identification in specialist plant groups



*Eremophila denticulata*

***The WA Herbarium and associated regional herbaria together form a unique, dynamic, state-wide team which gathers, manages, researches and communicates information on the geography, systematics and biology of our unique and precious flora on behalf of all members of the Western Australian community.***

***In doing so it plays a vital role in a national and international network of herbaria and allied biodiversity conservation agencies.***

## Contact Details

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