**Research Notes for the Teacher**

DESCRIBE. Provide an ecological description of the Great Western Woodlands, including the characteristics of the woodland and some examples of species that live in the area.

**Boundary**

The Great Western Woodlands is close to 16,000,000 hectares (40,000,000 acres) in extent, an area larger than England and Wales. Considering an area this large as a single unit for land-use planning is relatively new. Prior to 2006, the northern part of the region was often known locally as the [Goldfields](https://en.wikipedia.org/wiki/Mineral_fields_of_Western_Australia), with a plethora of local names used in the Western part. Researchers at the Australian National University mapped the Great Western Woodlands boundary using satellite-derived [Modis](https://en.wikipedia.org/wiki/Modis) data. The boundary separates the eucalypt woodlands from the mulga (*Acacia aneura* complex) dominated country to the north, the treeless Nullarbor Plain to the east, the higher rainfall coastal heath to the south east, and agricultural land to the west and south.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

**Land tenure**

The dominant land tenure in the Great Western Woodlands is Unallocated Crown Land (UCL), which makes up 60% of the area. UCL is the lowest category of land classification under Western Australian state law – sometimes called "orphan country". Pastoral leases cover 20% of the area. Conservation reserves of various types represent about 15% of the region, with Class A conservation protection over 3.6% of the land, Class B on 4.5% and Class C on 4.5%. Class B and C reserves have relatively little security of tenure, while Class A reserves require parliamentary approval for any tenure changes. The remaining land in the Great Western Woodlands is divided between shire reserves, Crown reserves and freehold land.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

**Biodiversity**

More than 20% of Australia’s flowering plant species and 30% of Australia’s Eucalyptus species are found within the Great Western Woodlands – making it a highly significant bioregion at a national and international level. The understanding of the biological diversity of the Great Western Woodlands is still being expanded by ongoing scientific work. The Great Western Woodlands account for a significant component of the plant diversity found in the Australia’s South West Global Biodiversity Hotspot. One of the main reasons why the Great Western Woodlands is biologically rich is its position within the path of significant physical and biotic gradients. It is located in the interzone between Australia’s moist, cooler south-west corner and its desert interior. This means the region has elements of both these climatic zones, but has also created conditions to allow for natural speciation to occur.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

**Vegetation types**

The Great Western Woodlands region is a matrix of four broad vegetation types: woodlands, mallee, grasslands and sandplain shrublands. Woodlands are the most common type of habitat, covering more than 9,000,000 hectares (22,000,000 acres). Woodlands are defined as those treed habitats that contain less than 30% canopy cover (in contrast, "forests" are defined as having greater than 30% canopy cover).[[17]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-17) Woodlands therefore resemble forests with greater distances between the trees, and more open canopies. Likewise, the understorey in woodlands is often very spacious compared to that of forests.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

**Flora**

According to the [Herbarium of Western Australia’s](https://en.wikipedia.org/wiki/Western_Australian_Herbarium) records, there are 3,314 flowering plant species from 119 different families and over 4,200 different taxa (which includes undescribed species, subspecies, hybrids and varieties) recorded so far for the Great Western Woodlands. It is estimated that almost half of these species are endemic to the south west of Australia.[[5]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-hopper-5) This floristic diversity can be attributed in part to the wide range of habitats throughout the region, from heavy soil valley floors, to sandplain, salt lakes, granite hills, banded ironstone hills, greenstone belt mosaics and many others. Each of these environments provides the conditions for unique types of flora. The amount of plant diversity in the Great Western Woodlands is comparable to the plant diversity in Canada, a country more than 60 times the size of this region.[[18]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-18)

**Fauna**

The [Western Australian Museum](https://en.wikipedia.org/wiki/Western_Australian_Museum) and [BirdLife Australia](https://en.wikipedia.org/wiki/BirdLife_Australia) have recorded that within the Great Western Woodlands there are 49 species of mammals, 14 species of frogs, 138 species of reptiles, and 215 species of birds. As more biological surveys are done in the area it is expected that these numbers will grow. The region’s high number of reptiles stands out as exceptional compared to other reptile communities around the world.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

Some of the mammals found in the Great Western Woodlands region include the greater long-eared bat (*Nyctophilus timoriensis*), western brush wallaby (*Macropus irma*), red-tailed phascogale (*Phascogale calura*), and the western quoll or chuditch (*Dasyurus geoffroii*). Some of the reptiles found in the region include the carpet python (*Morelia spilt imbricata*), the western bearded dragon (*Pogona minor minima*), and the common slender blue tongue (*Cyclodomorphus branchialis*). Birds found in the region include the Australian bustard (*Ardeotis australis*), the bush stone-curlew (*Burins grallarius*), Carnaby’s cockatoo (*Calyptorhynchus latirostris*), and the malleefowl (*Leipoa ocellata*).[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

**Threatened species**

As part of the Great Western Woodlands overall biodiversity, the region is home to a variety of threatened species. Currently there are 44 plant species in the Great Western Woodlands that are listed as "declared rare flora" by the West Australian Government. In addition to this there are 422 "priority" species of flora in the region. Species are listed as "priority" if they appear in only small or limited populations, which are threatened. Such small populations can be due to plant life having very specific environmental tolerances or to plants being adapted to rare habitats.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)The classification can also indicate species that are poorly known, and in need of further survey work to establish their status.

The region is also home to many fauna species that are rare and vulnerable. There are 32 threatened vertebrate species on the endangered fauna list of the Western Australian Government, which include 16 mammals, 8 birds and 8 reptiles, all of which exist or are likely to exist in the Great Western Woodlands. Furthermore, the pig-footed bandicoot, the long-tailed hopping mouse, the crescent nail-tailed wallaby and the broad-faced potoroo that were once found in the Great Western Woodlands, are now considered globally extinct.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

**Human settlements, communities and economy**

The Great Western Woodlands has been home to numerous Aboriginal language groups for thousands of years. This long-term management of the land by Aborigines has influenced the characteristics of the environment.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

Gold was discovered in the region by European prospectors in the late 1800s, which triggered a mining boom throughout the area. The population around this time boomed to 50,000 people located in over 50 towns. Most people living in the area around this time were employed in the mining sector or other service related industries.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

Population in the region had declined since gold rush days, until nickel was discovered in the region in the 1960s, triggering another period of rapid growth due to mineral resources. Today it is estimated that the population has returned to 50,000 people living in the major towns including Kalgoorlie, Coolgardie, Norseman, and Western Cross. While mining and mineral exploration have remained the major economy drivers in the region, tourism, especially nature-based tourism, is growing and it is beginning to add significantly to local economies.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

Recent studies have indicated that, with adequate conservation and promotion, the Great Western Woodlands could play a significant role in regional economic diversification.[[19]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-19)

Scientific research done in the Great Western Woodlands has estimated that currently there are ~950 million tonnes of carbon stored in the vegetation and soils of the region.[[8]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-wilderness-8) Carbon that is stored in natural ecosystems such as woodlands is referred to as [green carbon](https://en.wikipedia.org/wiki/Green_carbon). Green carbon is stored in both living and dead plant matter and in soils. Managing natural ecosystems, and the carbon they store, is believed to be crucial in a comprehensive approach to addressing climate change. Large and intense fires are identified as the most significant threat to green carbon stocks in the region. With better management, it is estimated that an additional 600 million tonnes of carbon could be stored in the region. This is equivalent to four times Australia’s greenhouse gas emissions for 2008. To maximise the potential carbon stored in the Great Western Woodlands requires that further degradation of the land be avoided, as well as restoring currently degraded ecosystems back to full maturity.[[30]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-30)

**DESCRIBE**. Provide a brief history of how humans have impacted the Great Western Woodland, including both pre-European history and modern history.

Archaeological evidence shows that [Aboriginal people](https://en.wikipedia.org/wiki/Aboriginal_Australians) have had a direct and continuous role in the maintenance and use of locations in the Great Western Woodlands region for at least 22,000 years.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

There are around ten distinct Aboriginal language groups whose lands lie within or include parts of the Great Western Woodlands.[[9]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-9)

Land use by the Aboriginal people over so many years has directly influenced the characteristics of the environment that are observed today. These include, for example, the changes resulting from implementing different fire regimes across the landscape and specialised hunting practices. Aboriginal survival in this region required an intimate understanding of the landscape and the biota that lived within it. As an essential part of their life in this land the Aboriginal people of this region also constructed and maintained deep wells in order to access water.[[10]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-10)

Today, Indigenous communities with strong cultural and legal ties to country are located in many centres in the Great Western Woodlands. There are several [native titles](https://en.wikipedia.org/wiki/Native_title_in_Australia) and [land rights](https://en.wikipedia.org/wiki/Aboriginal_land_rights_in_Australia) claims covering more than 95% of the landscape of the Great Western Woodlands area.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)[[11]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-nntt-11)

Since 2014 two major Indigenous native title claims covering parts of the woodlands have been determined in favour of the Traditional Owners – the Ngadju and Esperance Nyungar claims.[[11]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-nntt-11)

The Great Western Woodland attracts tourists interested in experiencing four-wheel drive adventures, bird watching, Indigenous heritage and camping in the Outback.[[1]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-watson-1)

The historic [Holland Track](https://en.wikipedia.org/wiki/Holland_Track), the Granite and Woodlands Discovery Trail, the Golden Pipeline Heritage Trail and the Golden Quest Discovery Trail provide tourists with opportunities to learn about local history, explore granite outcrops and rich biodiversity, including woodland trees and wildflowers.[[31]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-guide-31)

Tourist destinations include the Karroun Hill Nature Reserve, [Boorabbin National Park](https://en.wikipedia.org/wiki/Boorabbin_National_Park), [Elachbutting Rock](https://en.wikipedia.org/wiki/Elachbutting_Rock) and surrounding reserves, Goldfields Woodlands National Park, Mount Palmer and Karalee Rock, [Frank Hann National Park](https://en.wikipedia.org/wiki/Frank_Hann_National_Park), [Peak Charles National Park](https://en.wikipedia.org/wiki/Peak_Charles_National_Park).[[31]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-guide-31)

**EXPLAIN**. Explain what is currently being done to conserve the Great Western Woodland.

The name Great Western Woodlands was given to the region in 2004 by scientists from the Australian National University working with conservation groups reflecting the significant scale of this region, the western location, and main ecological character.[[16]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-tws-16) An appropriate Indigenous name is still being sought.

Since 2004 the Wilderness Society has worked with a wide range of organisations and local groups to increase public awareness of the landscape scale ecological values of the woodlands, the threats to these values, and options for improved protection and management.[[8]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-wilderness-8)

Since 2005, other environment non-government organisations and science organisations have become increasingly involved. They include Gondwana Link Inc, The Nature Conservancy and Pew Environmental Group,[[16]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-tws-16) Birdlife Australia and CSIRO.

### Biodiversity and Cultural Conservation Strategy 2010[[edit](https://en.wikipedia.org/w/index.php?title=Great_Western_Woodlands&action=edit&section=23)]

Between 2008 and 2010 a Great Western Woodlands Stakeholder Reference Group representing the interests of Indigenous people, conservation, pastoralism, mining, tourism and local government was convened by the [Department of Environment and Conservation](https://en.wikipedia.org/wiki/Department_of_Environment_and_Conservation_(Western_Australia)) (DEC – now DPAW) to assist in the preparation of the first ever conservation strategy for the woodlands region.[[22]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-strategy-22)

The State Government allocated $3.8 million to support the strategy and fund projects that were aligned with the priorities identified in the Biodiversity and Cultural Conservation Strategy. This strategy provided guidance for future management of the region, taking into account the diverse economic interests as well as environmental and cultural values of the Great Western Woodlands.[[22]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-strategy-22)

### Goldfields-Esperance Development Commission 2016[[edit](https://en.wikipedia.org/w/index.php?title=Great_Western_Woodlands&action=edit&section=24)]

In 2016 The Goldfields-Esperance Development Commission, based in Kalgoorlie, released its Economic Blueprint[[32]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-32) for the region including the Great Western Woodlands. The Blueprint acknowledges the significance of the woodlands and the opportunity they present for sustainable and diversified economic development in the region:

“We reside in an ancient land, home to globally recognised biodiversity treasures such as the magnificent Great Western Woodlands, as well as rich, red deserts and the bright, white sandy beaches and aqua waters of the Western Ocean. In a world of increasing urbanisation, our natural assets, wilderness areas and vast expanse of land are a rare commodity. The landscapes and features of our region present a unique marketing position that can be used to attract people and investment from across the continents.”

The Blueprint recommends the preparation of a regional conservation plan covering the woodlands which would involve regional stakeholders, Traditional Owners, scientists and conservationists.

### Indigenous land management[[edit](https://en.wikipedia.org/w/index.php?title=Great_Western_Woodlands&action=edit&section=25)]

Following successful native title claims over much of the woodlands, Indigenous groups are re-establishing Aboriginal land management practices such as fire management, as well as tackling feral animals and weeds, establishing tourism ventures and reviving traditional cultural practices.[[33]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-33)

### Formal recognition[[edit](https://en.wikipedia.org/w/index.php?title=Great_Western_Woodlands&action=edit&section=26)]

Conservation groups and other community sectors continue to seek appropriate and agreed forms of long term recognition of the Great Western Woodlands – to aid in better planning and management and as a platform for increased promotion of the region.[[34]](https://en.wikipedia.org/wiki/Great_Western_Woodlands#cite_note-34)

**EVALUATE**. Different communities have different values and beliefs. In the 1800’s, the Great Western Woodlands were jeopardised to build Kalgoorlie and it’s mines. Evaluate how did social, economic and cultural beliefs of the Industrial Age impact peoples’ use of the Great Western Woodland?

**DISCUSS.** Discuss how the Kalgoorlie citizens of the 1800’s could have had both a healthy woodland and also enough wood to support their growing mining community.