



# Chapter 2

## *The Unique Nature of Australian Golf Courses*



## Wildlife

Australia, due to its separation from the remainder of the earth's landmass for millions of years and its diverse climate, has a wildlife population of great richness and diversity. Many of these animals are found nowhere else in the world. Golf courses can play a vital role in the preservation of Australia's wildlife, especially where development has replaced habitat.

Commonly the land surrounding golf courses is urban - houses, roads and concrete surfaces, which are not conducive to the ecosystem that existed before them. The average area of a golf course is 60 ha. This land has been set aside from development of houses and industry, or has been redeveloped from a degraded site such as landfill. As such, golf courses have retained, or recreated fragments of ecosystems, between and around the edges of turf playing surfaces, which are increasingly seen as very valuable to our native flora and fauna.

Management of the wildlife population on a golf course does not need to be expensive for the club. What is needed is expertise, education and a club commitment from the top management, to preserve wildlife in harmony with the game of golf. Often expertise on wildlife is readily available in the local community. Even amongst the members of the club. Government departments such as the National Parks and Wildlife, resource conservation, and the local council can also provide contacts for specific issues.

The first step is to identify the species which are present on the course, and research the species which were present in the past. Without this type of inventory, it is very difficult to make informed decisions.

Management of wildlife should not over emphasise the larger, more obvious species such as bright parrots or kangaroos. The complete biological diversity must be considered. A golf course which has a manicured surface from 'tee to green', and throughout the rough does not provide a variety of habitats. Ground litter (leaves twigs, branches, logs), bush rocks and dead timber (whether standing or fallen) provide an important habitat for smaller ground dwelling animals, reptiles, birds and invertebrates.

As many golf courses contain waterbodies, waterways and wetlands they are also a potential habitat for many native species which live in these environments. Species of frogs and native fish can colonise or be introduced to the habitats suitable for them.

Spending all, or a portion of their time in water, these species are also good indicators of environmental health. Poor water quality will render a habitat inhospitable to these animals. A diversity of wildlife indicates an environment which is in general good health. Frogs, due to their permeable skins, have been nominated as good biological indicators of environmental health. For this reason many study groups have formed around Australia. The state museums would

generally be able to help with contacts. Some groups such as the NSW Frog and Tadpole Study Group will identify frog species through taped recordings of their calls.

The affect of Roundup (glyphosate) on frogs has been a concern of environmental groups. Research conducted by Curtin University of Technology in Western Australia found that a surfactant in glyphosate was likely to cause toxicity problems in frogs. At least one manufacturer of a glyphosate herbicide has released a modified formulation of the herbicide which is now registered for use in or near water.

Golf courses with significant wetlands, waterways and waterbodies need to carefully consider their pesticide selection and potential toxicity in aquatic environments.

Insectivorous bats, reptiles and birds can also be at risk from pesticide accumulation through eating sprayed insects. The choice of pesticide, application technique and timing may be manipulated to decrease risk of harming these animal communities.

## Birds

Golf courses have a great opportunity to promote the conservation of birds. Generally golf courses provide (or with some thought can provide) the necessary elements to encourage birds. The most common birds on most golf courses are those adapted to open spaces. These are generally more aggressive species such as Mynas, Magpies and some parrots which can chase other more timid birds away.

### 1. Shelter

Required by birds for protection from predators for nesting and breeding. The selection of appropriate plant species is critical. Small birds often require dense foliage such as grevilleas with sharp foliage to discourage predatory birds and cats.

Larger birds may require hollows in eucalypt trees or nesting boxes. Old dead trees can be an important source of tree hollows and where possible they should be left standing provided there is no hazard to golfers, the public or maintenance staff. Tree hollows are not just important for birds but a range of other animals as well such as gliders, possums, native mice and frogs. Nest boxes can also provide shelter for animals. They need to be designed specifically, and therefore it is best to obtain expert advice so that the right type of box is located correctly for the right bird or animal.

Generally it is a matter of matching the habitat with the birds which are desirable to attract to the course. Waterbodies and wetlands can also attract birds. Diving birds need areas of deep water where as waders require shallow water. The provision of appropriate aquatic and bank vegetation and dead logs can be utilised for shelter especially if they are located on islands which cannot be reached by cats and foxes.

## 2. Food

The selection of vegetation as a food source is critical to attracting birds. Birds utilise a range of foods including nectar, fruits, nuts and seeds of grasses. Insectivorous birds search for insects which are attracted to the vegetation. Direct feeding of birds through bird feeders is generally not recommended by bird experts because it encourages the larger more aggressive species and may not be nutritionally balanced. This practice also discourages birds from learning to feed on natural foods and may spread bird diseases.

## 3. Water

The quality of water in waterbodies needs to be of a standard which is acceptable for birds. The management practices to maintain the quality of water in waterbodies, for aesthetic and aquatic reasons, will also help to maintain a water quality which is adequate for birds.

The Victorian Government has initiated the "Land for Wildlife Scheme", to encourage and assist private landholders to provide habitats for wildlife on their property, even though their property may be managed primarily for other purposes. One superintendent who joined the scheme found it to be valuable and worthwhile for the club.

Land for Wildlife, Victoria, has produced 38 information leaflets, available through the scheme, which contain topics relevant to golf courses, eg:

- No. 4 ***Wildlife management considerations on private land - a summary***
- No. 6 ***Wildlife needs natural tree hollows***
- No. 8 ***Principles of river and stream improvement for wildlife***
- No. 13 ***Natural regeneration: principles and practice***
- No. 14 ***Nest boxes for wildlife***
- No. 18 ***Old trees for wildlife***
- No. 28 ***Management of shallow freshwater wetlands for wildlife***
- No. 38 ***The value of dead wood to wildlife and agriculture***

## Australian Bird and Bat Banding Scheme

The Australian Bird and Bat Banding Scheme (ABBBS) coordinates research through the use of bands around the legs of birds and bats. By 1995 over 2.6 million birds and bats had been banded. The aim of the scheme is to research the distribution, movement patterns, population sizes, ages and other aspects of the lifecycle of birds and bats. If you find any such bands or dead birds/bats with bands you should contact the ABBBS (GPO Box 8, Canberra ACT 2601: Telephone 026 250 9404: Fax: 026 250 9455. Not all bands are part of the

## Queenscliff Golf Club, Victoria

***The Orange-Bellied Parrot (*Neophema chrysogaster*) is an endangered species which today features less than 200 birds in the wild. A significant habitat for the species in its annual migratory cycle is the Queenscliff Golf Club on Port Philip Bay, Victoria. The golf club over the past 10 years in conjunction, with local government departments and environmental groups, has introduced many initiatives to aid in the conservation of the species.***



*The Orange-bellied Parrot is an endangered species which can be found at Queenscliff Golf Club, Victoria*

***The club has fenced off areas of the birds' habitat, and pesticide spraying of fairways has been ceased for the duration the parrot is at the golf club. Feral animal control programs for cats and rabbits and planting of native species to provide further habitat has been initiated. In addition, the golf course has been made available to interested bird watching groups.***

## Problems with native animals

Occasionally wildlife species can cause problems on golf courses. Various bird and mammal species have been known to cause major damage to putting greens. Golf courses with specific wildlife issues should contact the parks and wildlife agency for appropriate advice.

### Feral Animals

Feral animals can affect many areas of golf courses. The European wild rabbit and the European red fox frequently cause damage through burrowing in soft sandy areas such as greens and bunkers. Feral cats and dogs cause damage to native fauna. European carp and mosquito fish have invaded water bodies and wetlands.

The Commonwealth Government has initiated the Feral Pests Program, run by the Australian Nature Conservation Agency and the Vertebrate Pest program, run by the Bureau of Resource Sciences. The VPP is preparing “best practice” guidelines for the most common vertebrate pests. In the first instance it is best to consult the local council and state department of agriculture (or equivalent) when dealing with problems caused by local feral animals.

## Native vegetation

### Native Vegetation - benefits of retention and establishment:

- It aids in biodiversity conservation.
- Retaining native vegetation saves on the costs of establishing new plants.
- Native vegetation requires less inputs and management although it still requires maintenance.
- It attracts Australian wildlife.
- It forms visually attractive communities.

Golf courses need to try and link significant native vegetation establishments into the local scheme of parks and conservation areas. These areas can create links of ‘green belt’ in the urban environment for the movement of native fauna and for maintaining genetic diversity.

Local environmental groups and councils can often provide lists of plants which are native to the local area. The Melbourne Indigenous Seedbank (MIS) is a project of Greening Australia Victoria which promotes the use of native plants and assists in vegetation restoration. The project includes native plant lists and a seed bank (trees, shrubs, forbs and grasses) for 12 separate regions of Melbourne. This source of locally collected native seeds is available to those interested in establishing native plants.

Many golf courses are likely to contain remnant vegetation. Remnant vegetation consists of small areas of vegetation which represent native plant communities that existed before clearing took place. These areas are likely to

be of greatest conservation value in urban environments, where much of the original vegetation has been removed.

The trimming or removal of trees in specific areas is often controlled by local councils. Before commencing any such practices, check with the council for any Tree Preservation Order or Policy and applications required for trimming or removal of trees. These policies outline the dimensions and genera of trees which are protected and therefore require council approval to be removed. Some plants are classified as weeds and are exempt from these orders or policies. These orders or policies may also apply to root pruning.

Some councils may also have a significant tree register, for specific trees which have amenity, function, historical, aboriginal or scientific importance. Golf courses should contact their local council to determine if any trees on the course are registered, and even nominate trees of note which should be registered.

### Remnant Vegetation - species identification and management

- Carry out an inventory of the area to obtain a species list.
- Protect the area from invasion by exotic species. This may mean control on traffic entering the area, installation of signs and prohibition on dumping of waste and rubbish.
- Carry out bush regeneration activities to remove any exotic vegetation. Information of bush regeneration techniques can be obtained from local environmental groups, courses conducted by local TAFE or community

### Native Turfgrass Species

Several breeding programs have been undertaken to develop Australian native grasses for use in turf. Recent research at the University of New England, NSW has led to the release of a native turf form of *Microlaena stipoides* (variety Griffin). Seed of Griffin should be available in the near future and it will offer another option to exotic turf species for many golf courses. It is hoped that this work will lead to other native species

## Weed Management

Australia has a range of introduced plants which are considered to be serious weed species and have been declared Noxious Plants. All landowners, including golf courses, have a responsibility to control these species. Noxious plant lists are available from each state government agency for agriculture, and often local councils.

### **Willows - a significant environmental weed**

It has recently been identified that Willows (*Salix sp.*) are becoming a threat to Australian rivers. It was thought that all willow trees in Australia could only be propagated through cuttings, and that no seed was set. However through further introduction of plants and hybridisation, the trees have been found to be able to produce seed, and spread rapidly. This ability to spread can block and choke rivers and greatly disturb environmental flows.

Many golf courses use willows as part of landscaping. Commonly they play an important role in soil erosion control. If they are to be replaced with alternative plants, other soil stabilisation strategies will be required before existing plants can be removed. Consultation with local council regulations and state government legislation is advised before any trees are removed.

## **Waterbodies & Wetlands**

Wetlands and waterbodies on golf courses include dams, lakes, creeks, streams, rivers, swamps, marshes, swales, ditches and any other areas which experience permanent or periodic inundation by water.

The banks of waterways and dams often consist of soil which has been deposited in flood times. These alluvial deposits are often richer in nutrients, and often support different vegetation communities than the surrounding landscape. These areas, termed 'riparian zones', need to be well vegetated, or turfed at increased height, to act as buffer zones for filtering pollutants.

Golf courses in many urban environments play a role in flood mitigation. They act as water detention basins and reduce the peak water levels downstream. The wetlands and waterbodies on golf courses can themselves have some impact on local flood management. If the water levels in these are low, prior to a flood event, then the detention of waters at flood time can also reduce flood levels downstream.

Structures on golf courses which retain and divert water will have impacts on landuse downstream, and the environmental flows of creeks and rivers. Consideration of these impacts must be taken into account in dam and drain construction.

### **Benefits of water features on golf courses**

- Aesthetically pleasing
- Integrated into the strategy of the golf game
- Provide a source of irrigation water
- Provide food, water, shelter and breeding sites for animals
- A habitat for aquatic vegetation

### **Threats to water features on golf courses**

- Fluctuating water levels
- Water pollutants
- Sedimentation
- Weed invasion

## **Camden Golf Club, NSW**

*Camden Golf Club is situated at Studley Park outside the rural town of Camden, 40km south-west of Sydney. In 1984 the rare and endangered native plant Pimelea spicata was discovered within the golf course. At the time, this was the largest known population of this plant. P. spicata is a small shrub with white-pink flowers and belongs to a group of plants called the rice flowers. The plant is classified as being endangered by the Commonwealth Endangered Species Protection Act, 1992. P. spicata is considered to be in danger of becoming extinct in the next few decades and currently the species is inadequately conserved.*

*There are 31 known populations of the plant in Australia, and the population on the course has been estimated at 500 plants. Camden Golf Club therefore represents an important site for the conservation of this species. The area where P. spicata is found has been declared out of bounds by the club and 4.5ha has been fenced to exclude access. Preservation of the plant has been easier to accomplish because the plant is growing on a golf course, where it can be kept reasonably free of disturbance.*

*A Conservation Research Statement and Species Recovery Plan has been prepared by the Australian Nature Conservation Agency (ANCA) for Pimelea spicata. This plan sets out the current knowledge on the plant and its populations as well as recovery objectives, recovery criteria and actions needed. Camden Golf Club has been able to help in the conservation of this threatened species.*

J.Kaapro/TRI



*Pimelea spicata is an endangered native plant which can be found at Camden Golf Club, NSW*

## Blue Green Algae

Blue green algae development in waterways and water bodies can be stimulated by increased nutrient concentrations in the water. Some blue green algae produce toxins which can be a serious health hazard for humans and wildlife. In addition blue green algae may produce aesthetically undesirable scums and unpleasant odours. Algicides used on blue green algae infestations may result in increased release of toxins due to the break down of algae cells. Treatment of the water through activated charcoal filters is the only way of reducing toxins to acceptable levels.

Blue green algae development is also related to stratification conditions in waters. Stratification occurs when a layer of warmer water develops on top of a cooler bottom layer. One method of reducing the risk of blue green algae development is to have a system which continually mixes the water. This may involve aerification devices which mix the water, and improve water quality through raising dissolved oxygen levels. Water samples can be tested in a laboratory for blue green algae.

## Water Weeds and other Algae

Australia is host to many introduced weed species which have become significant problems in wetlands and waterbodies. Some examples are Alligator weed (*Alternanthera philoxeroides*), Salvinia (*Salvinia molesta*), Azola (*Azola sp*) and Ludwigia (*Ludwigia peruviana*). Golf course managers require skills in identification and control of aquatic weed species (see Appendix 11. References for further information).

## Mosquitos

Areas of open water in urban environments can become breeding grounds for mosquitos. This poses a health hazard to staff and the local community. Managing water depth to minimise fluctuations, and introducing predators such as fish species which eat mosquito eggs are recommended.

## Groundwater

Groundwater occurs in the soil profile when the soil becomes saturated at depth from surface leaching and underground recharge. The management of golf courses can impact on groundwater.

Excessive irrigation can increase the recharge to the groundwater system. Rising water tables can then impact on the golf course and surrounding land. If the groundwater has become saline, it will bring salt into the root zone of plants, and result in wilting and toxicity problems. Elevated water tables can also cause excessively wet soil surface conditions and unnaturally high water levels for local wetlands and ecosystems. They decrease the stability of soil in road cuttings and increase rising damp problems in buildings.

Leaching from turf surfaces can transport pollutants to groundwater. Pesticides and nutrients are the main concern. Selection of pesticides for low leaching potential and

reducing irrigation after pesticides are applied, reduces the risk of such contamination occurring. The application of fertilisers to match turf requirements decreases the risk of the leaching of excess nutrients. Reducing the amount of irrigation after fertilisers are applied will also decrease leaching.

The use of groundwater for irrigation may result in depletion of groundwater reserves which will affect other users of the water. A possible side affect of the lowering of groundwater levels in coastal locations is the exposure of acid sulphate soils, and the associated environmental hazards.

Groundwater height and water quality can be monitored by the installation of test wells. These devices are relatively cheap and easy to construct and use. Details on methods of construction can be obtained from state government agriculture or land and water conservation agencies (see Appendix 1). A golf course may require several test wells, depending on the situation. Test wells allow the club to monitor changes to groundwater levels, salinity, and pollutant contamination.

Community based water quality monitoring programs such as Waterwatch (National), Ribbons of Blue (Western Australia) and Streamwatch (NSW), involve many people from all parts of the community. Several golf clubs have joined these programs, particularly in conjunction with local schools. This type of interaction helps all groups understand more about the local catchment and the problems encountered. The data generated can provide valuable information for the golf course and at the same time the community is receiving education about the management and benefits of the golf course.

### Raising the groundwater level may

- Increase soil salinisation
- Give a wet soil surface
- Disrupt natural cycles in wetlands
- Increase rising damp in buildings

### Lowering the groundwater level may

- Reduce water for other users
- Expose potential acid sulphate soils

## Areas of special significance

Our Aboriginal and historic culture is unique. In some cases golf clubs can play a role in the appropriate management of sites of heritage value.

Appropriate information is available from state or commonwealth heritage and land management agencies. For the specific management of Aboriginal sites contact the state Aboriginal Heritage Agency (see Appendix 1).

## Long Reef Golf Club, NSW

*Long Reef Golf Club is situated on the coastline of the northern beaches suburbs, 13 km north east of Sydney, NSW. This unique course is in the links style, extremely open to the elements, and surrounded by the Pacific Ocean on three sides. The centre of the course is a peaty basin which originally collected stormwater from the surrounding suburbs, overflowing onto the beach.*

*However when the 18 hole course was built in the 1930s, the value of this wetland area was underestimated, and was cleared and filled. Further drainage works to the course over the years meant that all the stormwater from the surrounding suburbs was directed straight to Fisherman's Beach. The local council found increasing problems with pollution and erosion on the beach.*

*Irrigation for the course was completely from town water, which was becoming very expensive for the club.*

*In 1993, a master design plan was developed for the course, and water storage was one of the top priorities.*

*The club applied for a grant through the NSW Environmental Trust to reconstruct a wetland system through the course. The aims were to clean up and slow runoff from the surrounding urban area before it reached the beach, and to provide an irrigation source for the club.*

*Following the success of the grant application and many meetings between golf course staff, designers, wetland scientists and hydrological engineers, work began mid 1996. At the time of writing, the wetland system is now full of water, and over 9000 wetland plants such as *Baumea articulata* and *Carex apressa* have been planted, with twice this number to come. Michael Bradbury, course superintendent at the time, said that the wetland restoration project had great benefits for all parties involved.*

J.Kaapro/AT



*Construction of a wetland system at Long Reef Golf Club, NSW, has brought benefits to the community through improvement in stormwater pollution.*

Other relevant bodies include;

- National Trust of Australia
- Heritage Councils
- State Aboriginal Land Agencies and Councils
- Aboriginal and Torres Strait Islander Commission
- State Tourism Agencies
- Museums
- Academic Institutions

These organisations will help identify local interest groups, whose expertise can be called upon for the development of management plans. Management plans for heritage sites may involve consultation with local historic groups, aboriginal communities, environmental groups and government departments.

### **Benefits of heritage places on golf courses**

- They give golf courses a unique identity, which attracts players.
- They give golf courses an importance in the community as providing heritage conservation.
- They help preserve sites of aesthetic, historic, scientific, social and spiritual importance for future generations.

Through open communication between all of the interested groups and the club, the co-operative management of heritage sites can be achieved. Outside groups must understand that management activities need to be carried out in ways which do not compromise how the golf course is used by players and management staff. In addition the management and maintenance of such sites should not place unexpected financial or other burdens on the club. The club also must realise other interested groups rights, the value of these areas and work with the community to preserve and accommodate items of cultural heritage.

The Australian Heritage Commission can help determine if a particular site is on the Register of the National Estate. The register is an inventory of natural, historic and Aboriginal heritage which should be preserved for present and future generations.

### **Role of Heritage Organisations**

- Identification of the significance of the site
- Define legislation applicable to the site
- Advise on the management of the site - fences, signs etc.
- Advise on on-going maintenance of the site
- Help develop an access program for interested groups

## **Environmentally sensitive areas**

When the Committee is required to prohibit play from environmentally sensitive areas which are on or adjoin the course, it should make a Local Rule clarifying the relief procedure.

An environmentally sensitive area is an area so declared by an appropriate authority, entry into and/or play from which is prohibited for environmental reasons. Such an area may be defined as ground under repair, a water hazard, a lateral water hazard or out of bounds at the discretion of the Committee provided that, in the case of an environmentally sensitive area which has been defined as a water hazard or a lateral water hazard, the area is, by Definition, a water hazard

*Note: The Committee may not declare an area to be environmentally sensitive, this can only be done by a government environmental authority.*

A specimen Local Rule is detailed in 'Decisions on the Rules of Golf'.

### **Sand surface greens**

A survey done by the AGU in 1995 indicated that one third of Australia's 1600 golf courses have sand surface greens, also known as 'sand scrapes'. At first it would appear that the potential for adverse environmental impacts from these greens would be negligible. There is no turf, so there is no irrigation, use of pesticides or fertilisers and no mowing.

A common practice in preparation of the putting surface of sand greens is to use discarded sump oil or a similar material on the surface of the green. The oil is mixed with the sand to produce a smooth surface for putting.

Concerns have been raised by some state environment protection authorities about the potential of this oil, or its contaminants, polluting the environment. Water pollution may occur if the oil runs-off or is leached into surface or groundwater. If the sand needs to be disposed of, for example in the case of a green re-construction, this material may be classed as contaminated.

There is a lack of national information on the types of products used, rates and methods of application and relevant management options for sand greens (see Appendix 10 for recommendations for future research).

### **Management of sand greens.**

**To minimise potential environmental impact**

- Minimise the use of hazardous materials such as sump oil on greens, and consider the use of alternative less hazardous substances
- Consider the source of the sump oil. Contaminants may increase the risk of pollution.
- Use all possible measures to minimise the risk of water or soil pollution.
- Disposing of sump oil-treated sand as contaminated soil. Have the soil tested to determine contamination levels.

## Wakehurst Golf & Recreation Club, NSW

*Wakehurst Golf Course is situated 8km north of Sydney. The course is surrounded by the Manly Warringah War Memorial Park, which contains remnant areas of native bushland. Placed 120m above sea level, the outlook of the course is a spectacular view of the ocean.*

*The long utilisation of the Sydney basin by the Aboriginal people has yielded a number of relic sites on the area. The NSW National Parks and Wildlife Service maintains a Register of Sites of archaeological interest throughout the state. Five sites on the Register are located within the boundaries of the course.*

*Rock carvings occur on Hawkesbury sandstone platforms at the five sites. The carvings vary from single carvings of a kangaroo or a whale, to a group of more than four carvings at one site, including a figure of a man spearing a fish, two large fish, one small fish and some grinding grooves.*

*Under the National Parks & Wildlife Act 1974, it is an offence to interfere with any Aboriginal site without*

*consent of the NPWS. The NPWS and the club developed a management plan to protect the sites in harmony with the game of golf. There were concerns that obvious protection measures would attract unwarranted and damaging interest. Therefore the following measures were instigated:*

- *fencing the natural boundaries of the rock platform areas with a low post and rail fences, so that people were not attracted to the site, but were alerted if they walked close to the areas.*
- *placing discreet signs at the entrance to the areas, giving information about the sites and advising golfers not to wear spikes if retrieving balls from the sites.*
- *informing all players through the golf card, the location of the sites and regulations protecting the sites.*
- *redirecting construction works away from the sites.*
- *regular inspections by the Park Manager.*



*Aboriginal rock carvings at Wakehurst Golf Club are sites of archaeological interest on the register of NSW National Parks & Wildlife Service.*

J.Kaapro/ATF