DARDANUP STREAM CORRIDORS AND LAND FOR WILDLIFE

Introduction - Clearing and Fragmentation

In the Dardanup area, as in many of the intensive agricultural areas of the south west, most of the original native vegetation has been cleared in the last 160 years. In most cases, the original suite of plants and animals is automatically lost from the areas cleared, although they may still occur in nearby uncleared areas, or there may be particular species which are suited by, or able to adapt to, the changed conditions.

It is unlikely that readers of this newsletter need convincing that what remnant vegetation is left in the Dardanup area is precious, or that protecting, enhancing and even replacing it, especially along stream lines, is needed to benefit wildlife as well as for sustainable farming. Nevertheless, it is worth looking briefly at some of the factors which have resulted in the loss of much of the local wildlife, and which, unless remedial action is taken, will continue.

As in other parts of the agricultural area, some habitats have been more extensively cleared than others, and the remnants are not representative of the original vegetation. For example, rocky areas unsuitable for agriculture are relatively well represented in conservation reserves, while the more arable and productive soils are poorly represented, and are largely cleared. Thus, it is the wildlife specifically adapted to the more fertile and arable soils which has been most affected by agriculture.

Further, many terrestrial conservation reserves and other patches of remnant vegetation are blocks or strips, usually small, of naturally vegetated land surrounded by land which has been cleared for agriculture or urban development, or otherwise substantially altered by land management practices. This fragmentation of natural vegetation acts as a threatening process in its own right and has four major implications for management for nature conservation.

- The total area of various kinds of habitat is reduced, decreasing the populations of species using those habitats and therefore increasing the chances of their extinction. Ecological theory, supported by the results of field experiments in several parts of the world, suggest that a 90% reduction in the area of habitat results in an eventual halving of the number of species of organisms present. This is the primary process which has brought about the local extinction of many species of mammals and birds from agricultural parts of the State, and in many cases about 90% of native vegetation has been cleared. (Ominously, a recent survey of wheatbelt birds by Dr Denis Saunders of the CSIRO suggests that about 50% of the original species complement have declined this century). The percentage of fully cleared land in Dardanup Shire is .

- Remnants of the various habitat types may be separated from each other by an environment which does not allow the movement of some species of animals. This has two effects: first, seasonal migration or other movements which are a necessary part of the life cycle of some animals may be prevented; and secondly, immigration rates into remaining patches may be reduced, again making extinction of local populations more likely and replacement by immigration less likely. In these respects these remnants are like islands, and are particularly prone to loss of species.

- Remnants of natural ecosystems which are low in the landscape (especially wetlands) may suffer degradation from the 'downstream' results of intensive management. These include salinization, changes to the water table and the input of nutrients, sediment and other pollutants.

- Finally, fragmentation of natural habitats increases the perimeter-to-area ratio of remnant patches and therefore increases the impacts of 'edge effects'. These include the effects of sun and wind, the invasion of weeds and other species not a part of the original ecosystem, and the influence of activities such as the application of fertilisers, herbicides and pesticides occurring on neighbouring lands.

Other Threatening Processes

The other processes which are likely to have most impact in the Dardanup area and other parts of the southern coastal plain are competition and predation by introduced animals, invasion by weeds, introduced diseases, and habitat alteration by grazing and other disturbances, changes in nutrient status, fire regimes or hydrological processes. These are discussed briefly below.

- Many mammals, birds and some invertebrates introduced into Western Australia have the potential to cause, or have caused, extinctions. In the Dardanup area the only introduced herbivores that have gone wild and caused significant competition and degradation are rabbits, but domestic stock are extremely efficient grazers and are usually present in artificially high numbers, so competing with native grazing animals, and affecting habitat structure and composition.

- Two exotic predators, the cat and the European red fox, are abundant around Dardanup and studies elsewhere have shown that the fox is implicated in the disappearance of remnant populations of many threatened mammals. Although less complete, accumulated evidence shows that predation by feral cats can also cause the decline and even loss of populations of some species of birds and mammals.

- Weeds have replaced and are replacing native plants and altering ecosystems over wide areas of the State, including around Dardanup. Local examples include the swamping of remnant vegetation by watsonia, veldt grass, bridal creeper, and cape tulip, and the choking of wetlands by bulrush (*Typha orientalis*) and watsonia.

  Many of the most damaging invasions of weeds are concentrated on wetlands, flood-plains and streamlines (ie. the better watered parts of the environment). This is of profound ecological significance because of the key role that these habitats play in the survival strategies of many Australian plants and animals. It is also of particular significance in the Dardanup area where much conservation effort is likely to be concentrated on protecting or rehabilitating vegetation along drainage lines.

- Several introduced plant diseases are threatening Western Australian plants. The major problem is dieback, caused by the microscopic, soil-borne water moulds belonging to the genus *Phytophthora*, especially *P. cinnamomi*. *Phytophthora* species attack plants via the roots and many species in the most diverse plant families in Western Australia are killed.

- Of the other factors fire is probably the most important and the least understood. Some fire regimes (fire frequency, season, size, etc.) can contribute to changes in ecosystems and to the disappearance of species. Throughout the agricultural areas of southwestern Australia, including around Dardanup, protection against inappropriate fire regimes is important to the conservation of small remnants of native vegetation.

- Most of these threatening processes are likely to act together and exacerbate the threatening impacts on native species. For instance, the inter-relationship between predators (such as cats and foxes) and habitat fragmentation and changes in habitat structure are likely to be critical for species on the brink of local extinction. Where some species can persist in the face of one threatening process the addition of a second or third may eliminate them.

Bearing these various threatening processes in mind can help to point to ways in which farm management can create land for native organisms and alleviate threats to them and so protect biological diversity on the property.

Basically there are two ways in which extra resources can be provided for wildlife. The first of these is to protect existing remnant vegetation, including wetlands, and to recreate habitat which is, as far as possible, like that originally cleared.

The second approach is to ensure that what small areas of particular habitat (perhaps somewhat degraded) are available provide all of the resources required by most of the original inhabitants of that habitat type. This can be done by providing artificial nest boxes, access to extra food or water, and protection against introduced predators, as well as by providing linkages across the landscape, so that the effective area of habitat available can be increased by the species' own movements.

Birds of the Dardanup Area

The principles discussed above can be illustrated by considering some of the species of birds native to the Dardanup area, what their key requirements are, and how corridors can be protected or enhanced to provide the needs of certain species.

Waterbirds

Some of the common waterbirds appear to be comparatively tolerant of changes to aquatic habitats, and to be able to use very small areas of wetland at different times of their life cycle. However, each species, whether rare or common, still needs a minimum set of factors to be appropriate before they can thrive in an area. For instance, the common Pacific Black Duck frequently raises broods of ducklings on small shallow ponds in cleared agricultural areas. These are often little more than low-lying areas which hold water for two or three months in late winter/early spring. Nevertheless, for successful breeding even the opportunistic Black Duck must have tree hollows or dense vegetation for nesting, either close to the water or connected to it by sheltering vegetation, so that the ducklings can be safely led to the shallow feeding area. Further, the pond itself must retain sufficient water long enough for the ducklings to be reared to independence.

Shyer species of ducks such as the Australasian Shoveler, Hardhead, and Blue-billed Duck need more shelter and wider barriers between nesting areas and disturbances such as human activity and domestic animals.The last two of these also need areas of somewhat deeper water because they are diving ducks rather than dabblers like the Black Duck and Shoveler. Most species of waterbirds prefer waterbodies with emergent trees or shrubs for roosting and shelter.

If even shyer wetland birds, such as the crakes and rails, are to occupy an area, they need shallow muddy areas adjacent to dense rushes, reeds or tall grasses or other low herbage, in which they hide and nest. This group, and the rarer bitterns, which need extensive areas of rushes or reeds, would almost certainly have been relatively common around the many natural wetlands of the Dardanup area before drainage and clearing. They are mobile birds, probably flying mainly at night, and are quite capable of relocating and surviving in a system of relatively small areas as long as their needs of food and shelter are met.

Ground-dwelling birds

As for most groups of species which are lumped together under some broad description, it is hard to generalise about the habitat needs of most ground-dwelling species because each of them has specific requirements. Birds like the Bush Stone-curlew, (which is now probably extinct in the Dardanup area but could return if cats and foxes were reduced and the right habitat was returned) uses open woodland with patches of grassy litter, and areas of fallen trees and branches around which it shelters and nests. The two species of quail need low grass and herbage, dryer and relatively open, like harvested wheat stubble, in the case of the familiar Stubble Quail, and damper, ranker vegetation for the Brown Quail. The Painted Button-quail prefers woodland habitat somewhat like that of the Bush Stone-curlew, but usually with a patchy shrub layer under the taller trees. Some species, especially the Banded Lapwing and Richards Pipit, are perfectly at home in sparse low grassland, including grazed paddocks, but as they nest on the ground, need protection against disturbance and predation during the breeding season.

The one generalisation which can be made for all ground-dwelling species is that reducing the numbers of introduced predators is one of the most important single actions that can be taken. It will also benefit other wildfife, including other birds, small and medium-sized mammals and reptiles.

Parrots and cockatoos

The key issue for most of these species, as for many others, is the interaction between requirements for breeding, shelter and food. The Australian Ringneck or Twenty-eight Parrot is an extremely opportunistic feeder, and seems to be able to learn to use many new resources as the environment changes. It has come to dominate much of the agricultural area of the southwest.

Many of the other parrots which are much less common, and which we would like to encourage, are tied more closely to particular types of food which needs to be close enough to nesting sites for the adult birds to be able to gather enough food to feed four or more hungry chicks each day. In the Dardanup area, food is not likely to be limiting for the seed-eating Elegant Parrot, and the seed, fruit and blossom feeding Western Rosella and Regent Parrot. However, it is likely that they come to the area outside the breeding season to feed, and withdraw to more timbered places, where all resources are at hand, to breed. It would not, however, require very many mature trees with nesting hollows, or nesting boxes with holes of the right size, to allow more of these species to breed in the area.

Birds of the upper and middle foliage

The twenty or so of these small to medium sized songbirds which are native to the Dardanup area are dominated numerically by honeyeaters and birds such as the whistlers, the Grey Fantail and the exquisite little pardalotes. All eat many insects gathered from the leaves and branches of trees. The honeyeaters and Silvereye also feed heavily on nectar, and are important pollinators for many native species of trees and shrubs. Many of these species require a combination of large-leaved trees such as eucalypts in which to forage, an abundance of lower shrubby species for shelter and breeding and the provision of a year-round supply of nectar and the associated insects.

A number of these species, especially the Grey Shrike-thrush and the Rufous and Golden Whistlers, are superb singers and are a joy to have around any homestead.

Importantly, a number of them, even quite tiny birds such as the Brown Honeyeater and Spotted Pardalote, may undertake regular seasonal movements, either for breeding purposes or following food resources. Such small birds do not like to move more than a few tens of metres through open space, but prefer to travel from tree to tree, from cover to cover. Unless there is more or less continuous cover of trees and tall shrubs from Spring and Summer habitat in the south and along the coast, their autumn movement northwards or inland is impossible, and populations will decline or disappear. Corridors of mixed tall trees and shrubs along watercourses, fencelines and road reserves not only provide resurces for feeding, shelter and nesting, but can allow these important seasonal movements to continue.

Small birds of the ground and low shrubs.

This group contains some of the most attractive and desirable of all birds to have on your property. Most of them are beautiful to see and will become quite confiding if safe from cats and other predators. They feed almost entirely on insects. The brilliantly blue Splendid Fairy-wren is still common around country gardens and vegetated streamlines, while the more retiring, but similarly beautiful Red-winged Fairy-wren is now uncommon on the Swan coastal plain, although still abundant in streamside thickets of the forested hills.

Trees and tall shrubs alone will not guarantee the survival of populations of these tiny birds, which spend much time on or near the ground, and nest and shelter in dense ground level vegetation. Red-winged Fairy-wrens especially seem to need either thick spiky shrubs or dense clumps of sharp saw-sedge; if these are present along stream lines and around other damper places, the actual area of habitat that the species needs for survival seems to be quite small, especially if larger areas such as the forested scarp are connected to these narrow sanctuaries.

Conclusions - Making Your Stream Lines Attractive To Birds

The implications for management of much of the information above follow simple common-sense rules:

> diversity of habitat (including vegetation structure and composition) should be encouraged; try to provide three vegetation layers, low shrubs and/or herbs, taller shrubs, and trees.
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> grazing and too frequent fire should be avoided because of their effect on litter, ground layer vegetation and cover;
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> disturbance by vehicles should be kept to a minimum for the same reason and for its tendency to spread disease;
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> and feral predators should be controlled.

Throughout the southwest, achieving these aims has been shown to be consistent with good farm management: fencing stream lines, and protecting them against too frequent fires and other disturbance is necessary for landcare purposes; vegetation with a complex structure and diverse composition will provide better windbreaks and more habitat for beneficial birds and invertebrates likely to help control pests; and the control of foxes is increasingly being shown to substantially increase lambing success.

Management of remnant or rehabilitated vegetation which follows the simple rules above can be enhanced further by activities deliberately aimed to benefit particular species or groups of wildlife. These include modifying dams and streamlines so that they act as wetlands, with shallow edges and some dense surrounding vegetation, and erecting nesting boxes to encourage the breeding of particular species of birds. Many other management activities are discussed in various books, such as "Wildlife in the Home Paddock" by Roland Breckwoldt (1983) and the more recent and specifically Western Australian "Managing Your Bushland" by Penny Hussey and Ken Wallace (1993). It is also intended to cover in more detail some of the issues raised in this article in further Land for Wildlife Notes and Newsletters.

If you would like more information about birds of your area and ways of providing habitat for them, or would like someone to conduct (or help you to conduct) a survey of birds on your property and provide you with an annotated list, please contact your Regional Land for Wildlife Officer. Alternatively, you could contact directly the Royal Australasian Ornithologists Union (RAOU) at 71 Oceanic Drive Floreat 6014, phone 09 3837749, between 9.30 and 12.30 each weekday.