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THE IMPORTANCE OF RIPARIAN HABITATS TO VERTEBRATE ASSEMBLAGES IN NORTH QUEENSLAND WOODLANDS. *Memoirs of the Queensland Museum* 35(1):248.1994.:- Northern Australia is characterised by large areas of seasonally dry eucalypt woodland with riparian systems forming a network of narrow strips of relatively mesic habitat within the drier forests. It is generally accepted that riparian habitats are vital to these ecosystems. Riparian vegetation is generally more structurally and floristically diverse than the surrounding woodland and could be expected to contain a more diverse and abundant fauna. The Australian wet/dry tropics has high seasonal variability in resource abundance as a result of the climatic differences between the hot wet summers and dry winters. Riparian systems within this ecosystem are likely to be vitally important in providing water, shelter and food for fauna, especially during the dry season. This paper is meant to be suggestive, not conclusive, in an attempt to promote research on riparian systems.

The observations discussed here were made during a vertebrate fauna survey of Dotswood Station to provide baseline information for an environmental impact assessment (Williams et al., 1993).

The study area of 2320 km² (Dotswood Station) is situated approximately 50 km south-west of Townsville. Four major sites were chosen (A, B, C & D), each with up to four sub-sites. Site E had no separate sub-sites and was only sampled once. Major habitat types and associated intensive sample sub-sites were as follows: open woodland, A2, A3, B1, B3; open forest, B4, C1, C4, D4; tall open forest/closed forest, D1, D2, D3; riparian, A1, B2, C2, E; rocky outcrops, C3.

The riparian sub-sites A1, B2, and C2 are characterised by dense stands of *Melaleuca leucadendra* often with a mixed shrub layer, while site E consisted of patches of closed *Tristaniopsis exiliflora* gallery forest and more open *Melaleuca leucadendra* / *Callistemon* spp. forest. Woodland sub-sites were all much more open, drier and less floristically diverse than adjacent riparian sub-sites. The transition from the dense riparian vegetation to the open eucalypt woodland was usually abrupt (approximately 20 metres).

The first faunal survey was conducted between 8 April-3 May 1991 (late wet/early dry season) and the second between 7 August-25 October (late dry season). Each sub-site was sampled by small mammal trapping, pit trapping, observational transects (for birds), spotlighting, active searching and mist netting (bats). For details of site selection, sampling design, techniques and results see Williams et al. (1993).

Most observations indicated a clear difference between the vertebrate species assemblages of riparian sub-sites and sub-sites in the adjacent drier forest. Birds exhibited the most obvious difference between habitats. Riparian sub-sites recorded, on average, 73% of the bird species recorded for the site (excluding water birds), as compared to an average of 35% for dry sub-sites. The average bird species richness of riparian sub-sites (34 species) was significantly greater than at dry sub-sites (17 species) ($F=13.5$, $df=1$, $p=0.0023$). There were 31 species (17% of total) of birds (includes waterbirds) which were exclusively recorded along watercourses, and an additional 26 species (14%) occurred in greater abundance at riparian sub-sites than woodland sub-sites, giving a total of 57 species (31%) of the birds which were at least partly dependent on riparian systems. In contrast, there were only two species of bird observed exclusively at woodland sub-sites.

Differences between sub-sites in the mammal assemblages were less clear. However, Water Rats (*Hydromys chrysogaster*) were observed only at riparian sub-sites, while Greater Gliders (*Petauroides volans*), Brushtail Possums (*Trichosurus vulpecula*), Agile Wallabies (*Macropus agilis*) and Brown Bandicoots (*Isodon macrourus*) all appeared to

be more abundant in riparian vegetation. Fishing Bats (*Myotis adversus*), a species restricted by the availability of free water, were recorded only at two riparian sub-sites.

Five species of reptiles which are restricted to riparian habitats were observed, including one snake (*Tropidonophis mairii*), two lizards (*Physignathus lesueurii* & *Sphenomorphus quoyii*) and two tortoises (*Elseya latisternum* & *Emydura kreftii*). All of the 16 species of frogs were recorded in riparian vegetation while only five species were recorded away from the riparian zone. Most species of frogs were clearly more abundant within the riparian zone.

The results discussed here suggest that vertebrate faunal diversity and abundance is considerably greater in riparian vegetation than in the surrounding habitat. It may seem inane to include exclusively aquatic species, for example fresh water turtles and waterbirds, in this discussion, however these species make a significant contribution to local and regional biodiversity and, as such, highlight the great importance of riparian habitat within this ecosystem.

The conservation and protection of riparian habitats is of paramount importance in preserving the biodiversity of the eucalypt woodlands of northern Australia. The protection of riparian vegetation is also an essential part of any land care program. Woodlands and forests are one of the most widespread and important habitats in Australia, therefore an understanding of riparian systems is necessary to enable the efficient preservation and management of this ecosystem.

It would be interesting to closely examine riparian systems in Australia to investigate whether:

1. riparian habitats contain a higher diversity and abundance of fauna than the adjacent woodlands/forests and thereby make a large contribution to local and regional diversity;
2. there are a significant number of species which are wholly or partly dependent on riparian systems for at least part of the year;
3. higher diversity and abundance is due to a combination of more available niches and more abundant resources, resulting from higher structural complexity and floristic diversity of the riparian vegetation, and a higher and more seasonally stable productivity;
4. riparian systems act as refuges during the dry season and a source of dispersal at the commencement of the wet season; the value as a refuge could be due to shelter, food, water, or breeding/nesting sites;
5. riparian habitats provide seasonally abundant resources such as nectar, insects, water and breeding sites which are vital to much of the biodiversity of these ecosystems;
6. riparian strips can act as corridors for species which find open, dry habitats a barrier to dispersal; and
7. the roles of riparian habitats increase in importance with the general aridity of the area.

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Literature Cited

Williams S.E., Pearson R.G. & Burnett S.E. 1993. Survey of the vertebrate fauna of the Dotswood area, North Queensland. *Memoirs of the Queensland Museum* 33(1):361-378

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