Awaroa wetlands: value assessment

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Published by
Department of Conservation
Head Office, PO Box 10-420
Wellington, New Zealand

This report was commissioned by Waikato Conservancy

ISSN 1171-9834

Reference to material in this report should be cited thus:

Burns, B. 1998. Awaroa wetlands: value assessment. *Conservation Advisory Science Notes No. 176.* Department of Conservation, Wellington.

Keywords: wetland forest, kahikatea, Meremere Ecological District, conservation value criteria

1. Introduction

This assessment of the indigenous wetland forest associated with the Awaroa Wetland Reserve adjoining Lake Whangape resulted from an inspection of this reserve on 14 February 1997. Specific questions were:

1. What is the conservation value in a regional and local context of the wetland forest, for example, its rarity, representativeness?

2. If willow removal from part of the main stream channel affects the frequency and reduces periods of inundation, what is the predicted outcome for the wetland forest?

2. Conservation value

The Awaroa Wildlife Management Reserve occupies 308 ha on the floodplain associated with the Awaroa Stream, from where this stream enters Lake Whangape to 2.3 km upstream. The vegetation of this reserve has been described by Champion (1988). Most of the reserve is covered by crack willow forest or by open swamp dominated by flax, cabbage tree, manuka, and *Coprosma propinqua.* However, substantial areas of indigenous forest occur including forests variously dominated by combinations of kahikatea, totara, matai, kowhai, and cabbage tree. Some stands of kahikatea are extremely wet and are regularly inundated up to 1 m above the soil level. There are 3-4 main areas of forest of different compositions but small stands of kahikatea also occur scattered through the crack willow forest.

The significance of natural areas can be assessed using the criteria established by Myers *et al.* (1987). These are:

1. Representativeness. What contribution does the reserve make to the conservation of all ecosystems present in the natural landscape?

2. Diversity and pattern. What is the diversity of ecological units represented?

3. Rarity and special features. Are there rare species, ecosystems, or special features?

4. Naturalness. How close to a natural condition is the reserve?

5. Long-term viability. Will the features of the reserve maintain themselves long-term without active management?

6. Size and shape. How large is the internal area of the reserve that is distant from many modifying influences?

7. Buffering. Is the reserve buffered on its boundary from modifying influences?

Consideration under each of these criteria is as follows:

1. The Awaroa Wildlife Management Reserve (WMR) occurs in the Meremere Ecological District (McEwen 1987). This is one of several ecological districts in the Waikato Region where removal of primary forest has been almost complete (Leathwick *et al* 1995). Primary forest is estimated to now cover only 0.5% of this Ecological District on landforms which once would have predominantly supported forest *(Ibid)*. Also, a major forest type in the reserve is kahikatea growing in swamps almost permanently inundated. Such a forest type is now rare in the Waikato Ecological Region (McEwen 1987) or the region administered by the Waikato Regional Council, although it would have been formerly more common. I know of only 2 existing similar stands: one at the Kopuatai Peat Dome, and one on private land in the Mangapu Stream catchment near Te Kuiti. It is therefore not well represented in reserves on a regional basis in the Waikato.

2. The indigenous forest patches present show considerable diversity in canopy composition from patch to patch. Champion (1988) identified five different forest types in the reserve.

3. Although a comprehensive plant species list is not available specifically for the Awaroa WMR, no plant species encountered during a brief field inspection is currently considered threatened (Cameron *et al* 1995). However, *Myriophyllum robustum* has been found in a lake-edge forest stand of Lake Whangape, similar to and nearby the reserve forests (Champion *et al* 1993), and may be present in the reserve. *M. robustum* is currently ranked as 'rare', taxa with small, at-risk populations (Cameron *et al* 1995). I cannot authoritatively comment on the presence of rare or threatened fauna in the reserve.

4. The reserve's naturalness is compromised in some large parts by the invasion and spread of crack willow and other adventive weeds. However, there are still large areas of swamp and indigenous forest patches, which are relatively free of such species.

5. There is no reason to suspect that the indigenous forests of Awaroa WMR are not viable in the long-term without active management. However, possum scratchings on totara trunks indicated preferential browsing of this species.

6. At 308 ha, the Awaroa WMR is a relatively large reserve compared to other protected natural areas in New Zealand (Wassilieff & Timmins 1984). Its shape does not present an unsatisfactory ratio of edge to internal habitat.

7. The reserve is not buffered from modifying influences on its boundaries but directly abuts agricultural land from which stock gain access

to the reserve. However, the hydrological regime in the Awaroa wetlands is buffered by maintenance of lake levels in Lake Whangape.

3. Conclusion

Although the Awaroa WMR has large areas of crack willow forest, is not known to support rare plants, is not buffered around its edges, and is browsed and grazed by possums and vagrant stock, nevertheless it is undoubtedly a highly significant protected natural area because:

(1) it contains some of the last remnants of forest in the Meremere Ecological District;

(2) some of this forest is swamp kahikatea forest, now rare in the Waikato; and

(3) it has a high diversity of plant species and forest types.

This significance has been recognised previously. John Nicholls, a Forest Research Institute scientist employed for many years to advise government departments on the selection of protected natural areas, recommended this area as a scientific reserve in 1973 (Nicholls 1973). This designation was reserved for areas of high natural significance worthy of high levels of protection.

4. Predicted outcome for wetland forest of channel clearance

Specific predictions of forest change must be based on detailed information on the current hydrological regime experienced by each forest patch, and the changes most likely in hydrology as a result of the willow clearance. This information is not available and therefore specific predictions of forest changes are not possible. However, some possible effects can be suggested based on broad principles. Hydroperiod is considered the single most important regulator in the ecology of wetlands and especially critical in determining species composition in plant communities and their zonation (Lugo *et al* 1990). It is the early life history stages of trees, i.e. seedlings, that are particularly sensitive to hydroperiod. In later stages of forest development, trees are less sensitive to season and annual variations (Harms *et al* 1980). As well, the direction of water flow is a critical factor in the organisation of plant and animal communities in wetlands. Water movement is very important for a forested wetland because it ventilates and renews the immediate environment of surfaces that come in contact with the moving water (Lugo *et al* 1990).

As described to me, the channel clearance of willows from part of the reserve should change the nature of flooding after rain events by reducing the frequency and periods of inundation of the flood-plain. It will also probably change the paths of water movement through the reserve. However, the underlying water table should remain unchanged, as this is determined largely by the lake level (A Roxburgh, pers comm). It seems likely that the proposed willow clearance will result in readjustment of the current vegetation zones of the wetland to a new hydrological regime. Some vegetation types will increase in area while others will decline. Such changes are likely to take several years to occur. Although the trees in forest areas will most probably survive intact, areas where seedlings may become established will probably change in an unpredictable way. Some changes in vegetation zonation may not be an unacceptable outcome of the works described. The greatest danger is that the instability created by these changes may provide opportunities for crack willow (*Salix fragilis*) and grey willow (*S. cinerea*), both present and highly invasive species, or other invasive weed species, to extend their distributions into previously unavailable territory, and therefore reduce the indigenous wetland values of the reserve.

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