"THE ASHFIELD FLATS - A STUDY OF PRESENT & POTENTIAL LAND USE"

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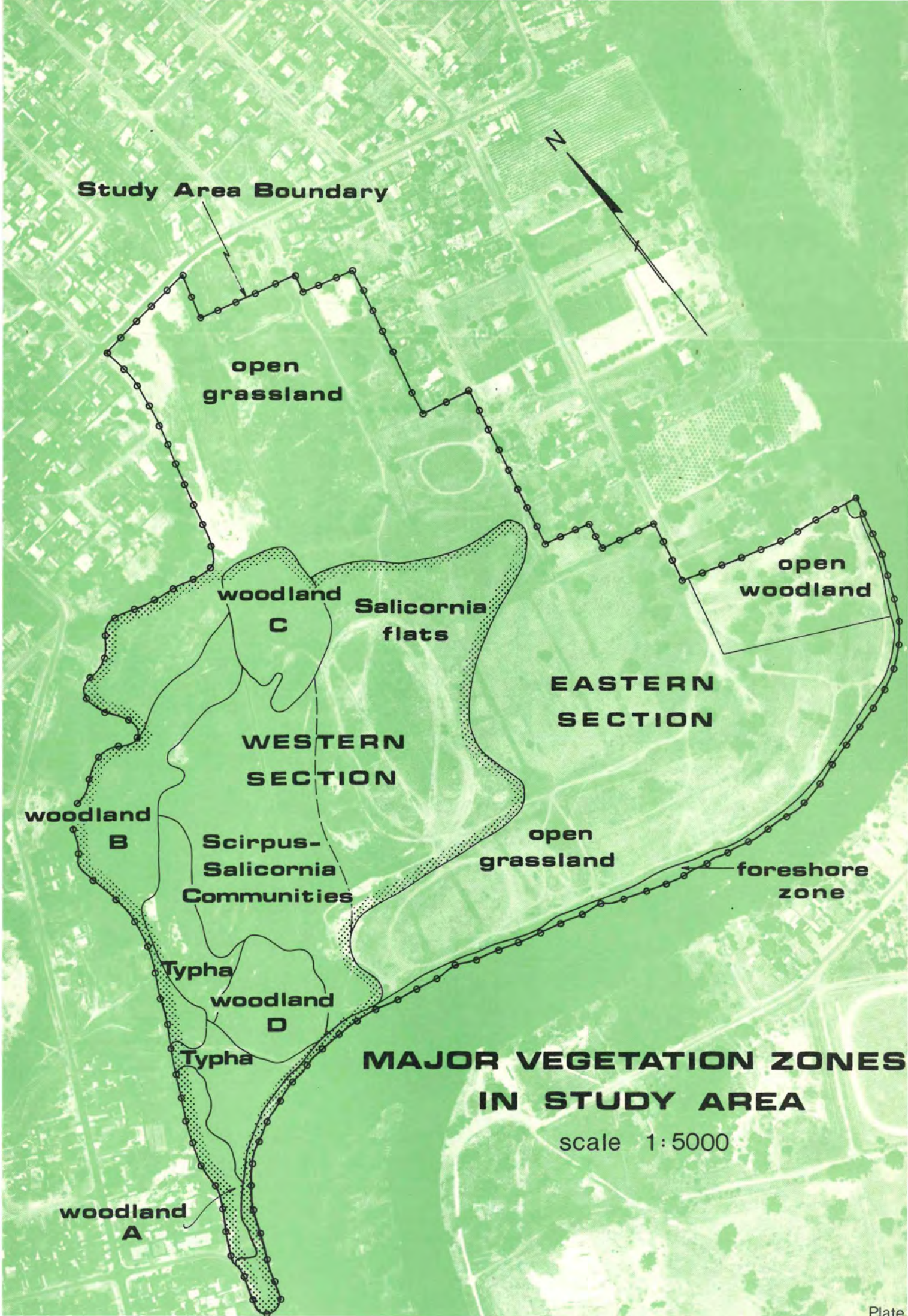

MAJOR VEGETATION ZONES IN STUDY AREA

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Plate

RECOMMENDATIONS

1. Extend the flora and fauna reserve area in the western section of the Flats so as to include all areas covered by wetland vegetation, including the Samphire Heath, (Figure 1, overlay). (Section 4.1).

2. Maintain the existing hydrological variability of the foreshore, buffer zone and proposed wetland reserve, by prohibiting the construction of drains, levee banks, retaining walls, etc. (Section 4.1).

3. Construct litter filters at the top ends of the two drains that run through the Flats. (Section 4.1).

4. Monitor the water quality of the drains for disease carrying organisms, fuel wastes, sediments, chlorinated hydrocarbons, organophosphates and other undesirable compounds. (Section 4.1).

5. Remove the refuse, car bodies, sheet iron, water tank, and other litter within the proposed reserve boundaries, with minimal disturbance to adjacent areas. (Section 4.1).

6. Attempt to revegetate the *Salicornia* spp flats within the proposed reserve extensions. (Section 4.1).

7. Employ methods that will enable the natural sedge communities, normally occupying the shallow fringes of the river, to re-establish. (Section 4.2).

8. Revegetate the region immediately behind the foreshore, and the eastern boundary of the proposed reserve with natural wetland species, such as *Eucalyptus rudis*, *Casuarina obesa* and *Melaleuca rhaphiophylla* (see Figure 1 overlay). (Section 4.2).

9. Construct playing fields for active recreation - levelling and using clean fill where necessary - in the eastern and northern sections of the Flats. (Section 4.3).

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1. INTRODUCTION

The study area for this report is a flood plain of the Swan River, located in the Town of Bassendean.

The aim of the study was to determine the condition of the flora and fauna of the area, with a view to assessing the conservation value and potential land uses of the area. Field work was undertaken on three consecutive days in June, 1978, and the report was compiled on the basis of information collected during this period and the following week.

2. DESCRIPTION OF THE AREA

2.1 Locality and Ownership

The Ashfield Flats region is located on a flood plain of the Swan River, in the Town of Bassendean. The study area is approximately 60 ha and is bounded on the south by the Swan River, the north and west by a ridge which marks the extent of the flood plain, the north-east by Villiers Road and the back of housing lots fronting onto West Road.

Contained within this area are two reserves :

1. Sandy Beach Reserve (A18092); designated for recreation, covers an area of 1 hectare.

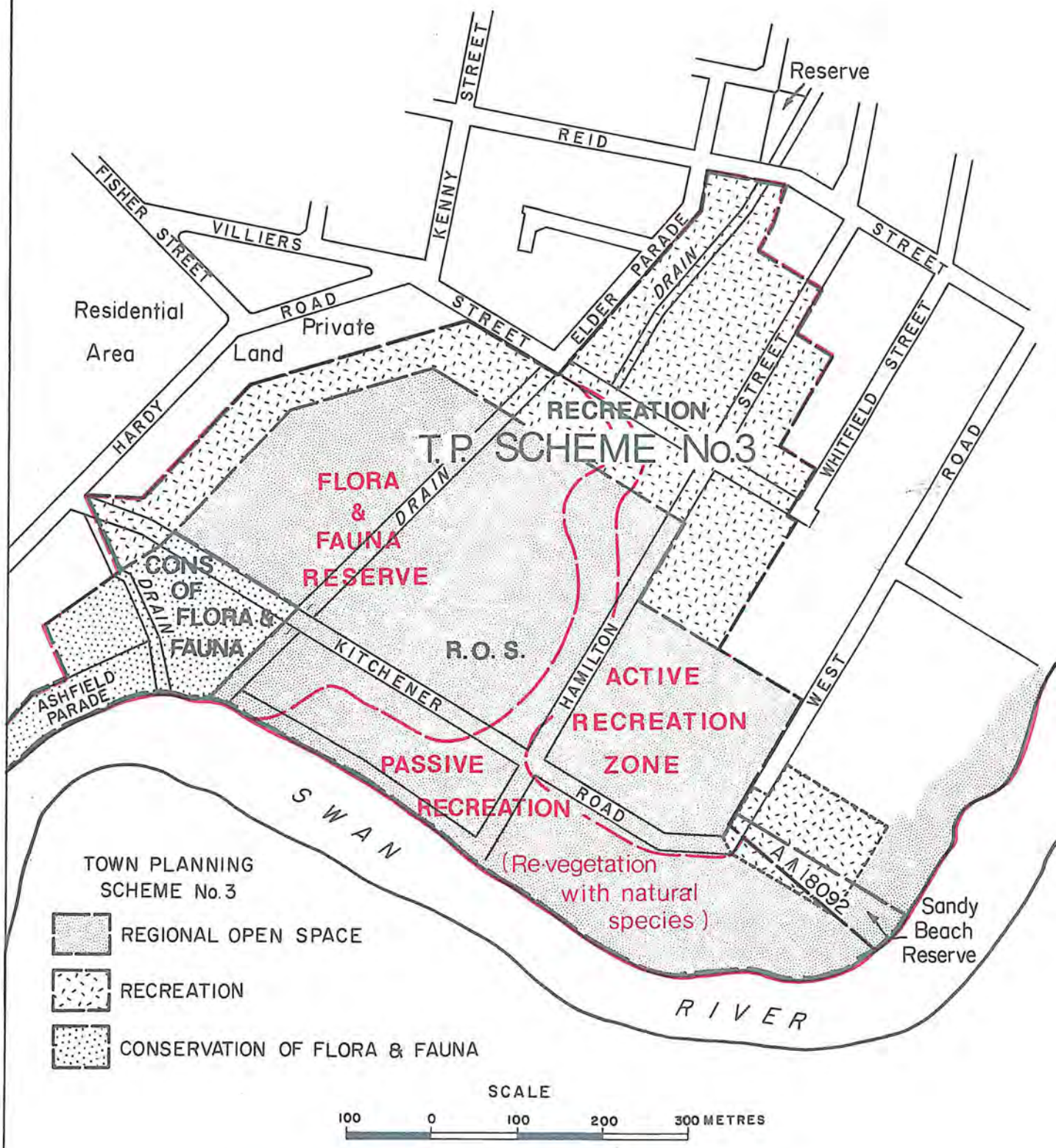
2. An area in the south-west; designated as a flora and fauna reserve under Town Planning Scheme 3.

As shown in Figure 1, the area is owned by the MRPA and the Town of Bassendean and is designated as regional open space.

2.2 Geomorphology

On the basis of elevation, the Ashfield Flats study area can be divided into two sub-areas. The western half demarcated on the aerial photograph (Plate 1) as recommended reserve area, is a lower-lying area subject to regular tidal inundation during all seasons. Associated with this area are characteristic wetland plant species adapted to such varying conditions.

The eastern section of the study area is higher ground and as such, is not affected by tidal flooding. In years of average or below average rainfall, this area would not be inundated. However, during exceptionally wet winters or during short periods of very heavy rain, flooding may occur.



RECOMMENDED LAND USES

ASHFIELD FLATS AREA

TOWN OF BASSENDEAN

FIG 1.

The Wetlands Advisory Committee to the Department of Conservation and Environment, has defined wetlands as :

"Areas of seasonally, intermittently, or permanently waterlogged soils or inundated land, whether natural or otherwise, fresh or saline, e.g. waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries".

On the basis of this definition the whole of the Ashfield Flats study area is a wetland, the western half of which is subject to regular tidal and seasonal flooding, the eastern section being an intermittent wetland.

The alluvial soils of the flood plain are predominantly clays and loams. Because of their depositional nature, variations in elevation are minor and gradual (see Plates 2, 3, 4 and 5).

The western region of the Ashfield Flats foreshore is more vulnerable to the natural erosional forces of the Swan River because it is situated on the outside of a meander. Plate 6 indicates the extent of erosion in this area. Conversely, the eastern section is situated on the inside of a meander and thus represents a depositional zone. However bank erosion is also caused throughout the area by wash from boats.

The salinity of the soil appears to vary, as is indicated by the distribution of a number of plant species with known soil salinity preferences. The areal extent of *Salicornia* spp, for example, is indicative of soils with high salt concentrations. Conversely, *Melaleuca rhaphiophylla* and *Typha orientalis*, have low soil salinity preferences.

Detailed soil analysis was not possible in this study, however, vegetation was used as an indicator of varying conditions.

2.3 Vegetation

The two most important factors influencing the distribution of the vegetation of the study area are soil salinity and elevation; the latter influencing the depth and permanence of inundation.

There are six general vegetation associations that have been recognized in the flood plain area.[1] They are :

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1. These general comments on vegetation should be read in conjunction with Plate 1 (the aerial photograph provided).

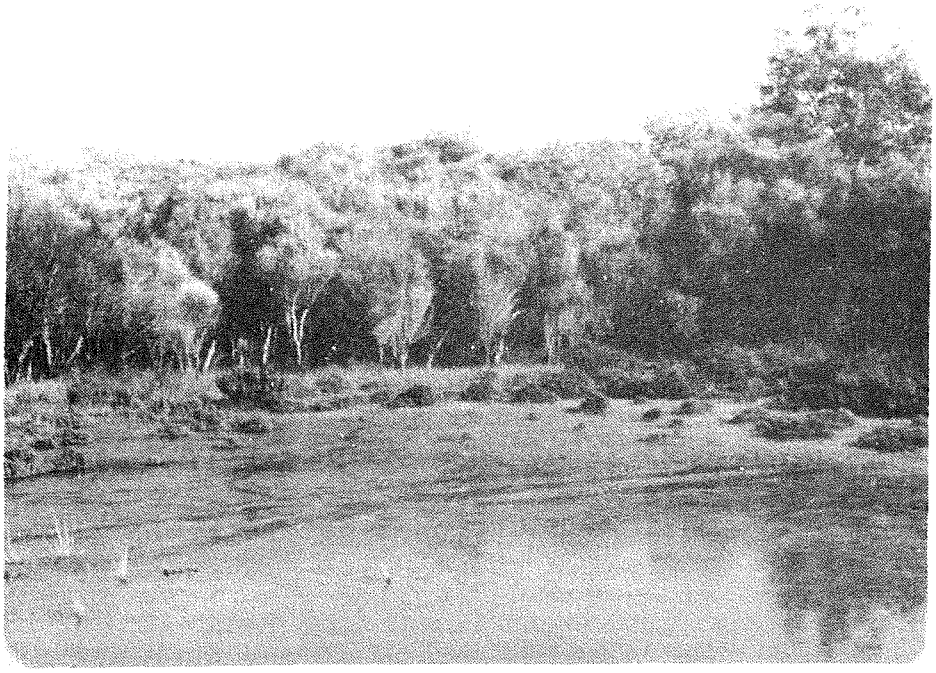

Plate 2 Flat, inundated area, covered by *Salicornia* spp in foreground, with *Melaleuca* spp, woodland area B, in background.

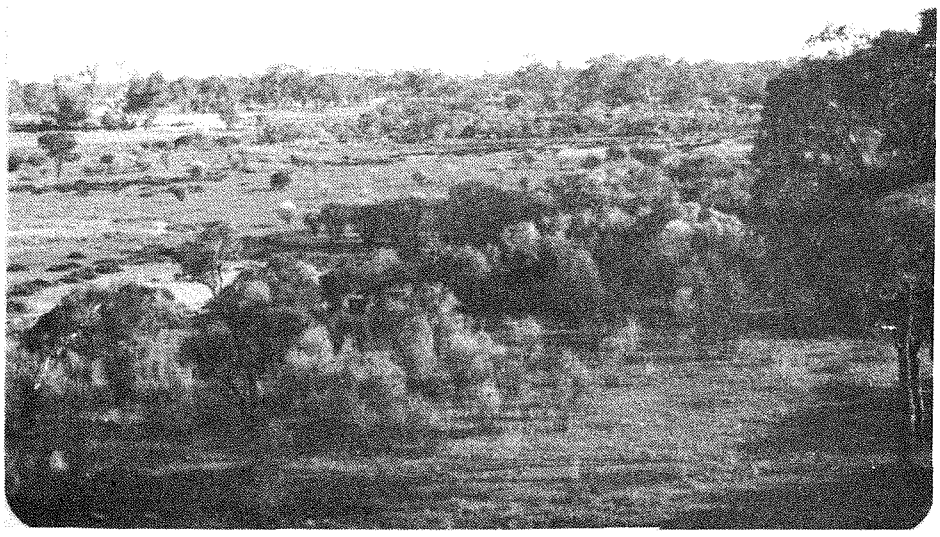

Plate 3 Flooded *Melaleuca* woodland (area B) looking S.W.

Plate 4 Flooded *Melaleuca* woodland and *Salicornia* spp looking south.

Plate 5 Flooded *Melaleuca* woodland and *Salicornia* spp flats, looking S.E.

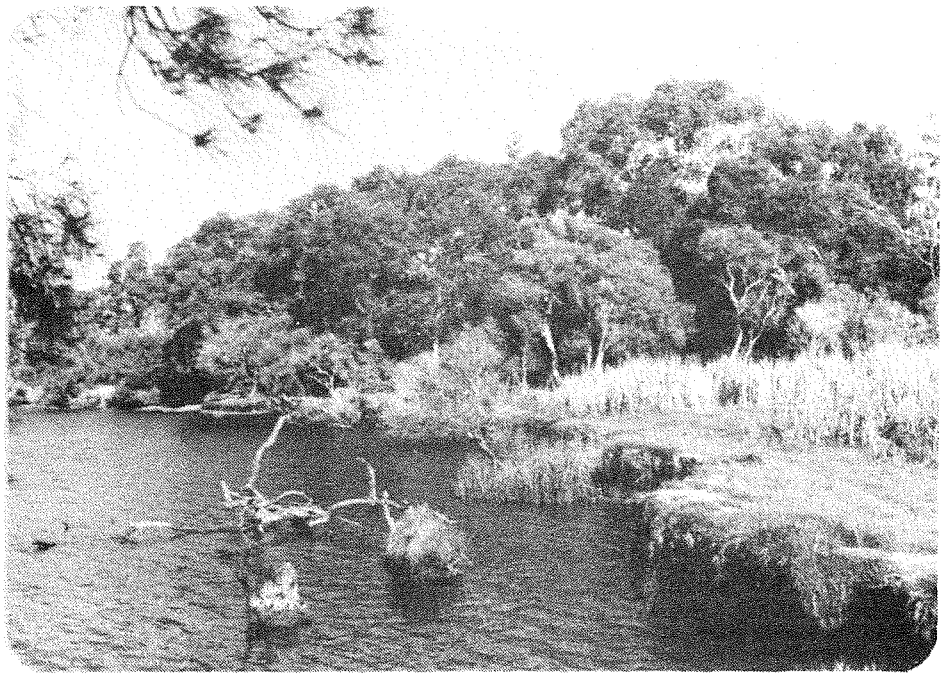

Plate 6 Riverbank on S.W. foreshore showing *Casuarina obesa* in foreground, *Typha orientalis* in the middle, with *Eucalyptus rudis* at the rear. The absence of littoral vegetation and the resulting bank erosion is also apparent.

1. Mixed woodland
2. Bulrush stands
3. Samphire heath
4. Mixed sedge - Samphire meadows
5. River foreshore vegetation
6. Disturbed areas with introduced species.

2.3.1 Mixed Woodland

For descriptive purposes woodland is divided into five categories, on the basis of location.

a. Area A is a dense woodland of *Eucalyptus rudis* (Flooded gum), *Casuarina obesa* (Swamp sheoak) and *Melaleuca rhaphiophylla* (Fresh water paperbark). This area is shown in the background of Plate 6. The vegetation is green, appears healthy, and is relatively undisturbed by man.

b. Area B is a low, sparse to dense woodland, dominated by three *Melaleuca* species; i.e. *Melaleuca rhaphiophylla, Melaleuca hamulosa* and *Melaleuca teretifolia*. A recent fire has either killed or scorched many of these trees, consequently there is dead wood interspersed with healthy trees - with some trees regenerating. In the southern portion of this area the woodland understorey is dominated by a sparse stand of *Typha orientalis* (Bulrush). The northern extremities are free of *Typha* with the understorey being ground cover vegetation such as *Centella asiatica* (a Pennywort), sparse stands of *Juncus* spp, *Triglochin procera* (Water ribbon), (the fresh water species) and *Cynoden doctylon* (Couch grass). Plate 2 illustrates the density and stature of a more healthy portion of this woodland. Plate 4 is an overview of area B looking south. This shows the fire-affected trees, and the variably dense nature of the tree cover. Plates 3, 4 and 5 show the more degraded northern portions of this fringing woodland.

c. Area C is a wooded area of varying density, consisting of *Melaleuca hamulosa, Melaleuca rhaphiophylla* (Paperbarks) and *Eucalyptus rudis* (Flooded gum). The trees generally appear healthy, although some small fringing trees have died. The under-

storey consists of sedges (*Juncus* and *Scirpus* spp) with dense couch grass infiltration.

In the centre of the thicket there is a small open pool. Plate 7 shows the northern edge of this paperbark stand.

d. Area D is represented by an island of higher ground maintaining a degraded stand of *Melaleuca* (*M. rhaphiophylla* and *M. teretifolia*) and *Casuarina obesa* (Swamp sheoak). Fringing trees in this stand appear healthier than those in the centre portion, many of which are dead, as shown in Plate 8. The distribution of trees within the stand is variable, but provides good cover. Much of the understorey vegetation is seasonal grass species, dead during the winter months. The understorey also includes *Juncus maritimus*, some *Salicornia* spp (Samphire) and much couch grass. Although in an elevated position, this woodland is still subject to extensive flooding.

e. In the eastern corner of the Ashfield Flats (i.e. the Sandy Beach Reserve and adjacent land) a sparse, and open woodland of *Eucalyptus rudis* is established on the lower flood plain areas. Further inland on the higher ground, *Eucalyptus calophylla* (Marri) takes over as the dominant native tree. This open woodland area has a grassed ground cover. In conjunction with these naturally occurring species there is a number of planted shrubs and trees (e.g. Cape Lilac, W.A. Peppermint and Queensland Box).

2.3.2 Bulrush Stands - *Typha* spp.

The establishment and growth of *Typha* is associated with disturbance, by man, of the natural wetland environment. *Typha* completely dominates a triangular area in the S.W. of the flat where it is present as a large dense stand. Most of these plants are dead, due to the short life span of the species and harsh summer conditions. Vegetative rejuvenation is slowly occurring, however, with small green shoots appearing amongst the old dead stalks. This large area of *Typha* is shown in Plates 9 and 10.

Plate 7 *Melaleuca rhaphiophylla* at northern edge of study area. (Woodland area C).

Plate 8 Central portions of Area D woodland.

As has been mentioned earlier, *Typha* has infiltrated parts of the western fringing woodland (area B). This is due mainly to the disturbance of this area. An example of human disturbance leading to the establishment of *Typha* is shown in Plate 11.

Typha is established in a sparse stand bordering on the eastern margin of woodland area B.

The growth of *Typha* is also associated with the drains crossing the area, which provide disturbed, higher banks on which the Bulrushes may be maintained. This is illustrated in Plate 11 and 12.

2.3.3 Samphire Heath - (*Salicornia* spp)[1]

Samphire Heath (*Salicornia* spp) of which two species are present, extends over low-lying saline soils east of the main drain. It is an area which has been much degraded by vehicle access. Constant traffic has created well-worn, compacted tracks, upon which no vegetation will currently grow. When the area is flooded these tracks appear as open expanses of relatively deep water. An overview of the *Salicornia* flats can be seen in the background of Plates 4 and 5, while a clearer view can be seen in Plate 13.

2.3.4 Mixed Sedge - Samphire Meadows

The fourth area demarcated by its vegetation associations, appears as an extension of the Samphire Heath areas, which continues on the western side of the main drain. Here *Salicornia* is established on small areas of higher ground. In association with the *Salicornia* is the salt water species of *Triglochin striata*, small stands of *Juncus maritimus* and extensive areas of sedge (thought to be *Scirpus maritimus*). The sedge and *T. striata* are present as small ground-cover plants occurring in sparse stands. Much of the swamp vegetation of this area had been destroyed by fire, and regeneration of these species is only now occurring. Introduced couch extensively covers the area.

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[1] Note The genus *Salicornia* is undergoing a name change to *Arthrocnemum*.

Plate 9 *Casuarina obesa* on river margin and extensive stand of *Typha orientalis*. The retreat of the river bank through erosion is evident.

Plate 10 Couch grass and *Typha orientalis* fringing S.W. drain.

Plate 11 Rubbish dump site with *Typha orientalis* behind.

Plate 12 Eastern drain with *Typha orientalis* occupying the disturbed areas.

Plate 13 *Salicornia* spp flats.
Note : Expanses of open water lying in vehicle track depressions (foreground and midground).

2.3.5 Riverbank Vegetation

The fifth important vegetation zone is the riverbank flora. Swamp Sheoaks (*C. obesa*) and Flooded Gums (*E. rudis*) are established intermittently along this stretch of foreshore. The sedge *J. maritimus* is naturally established along the bank in the intertidal zone, however this cover is being destroyed in some areas by erosion caused by wave action.

In those areas where erosion has occurred, the river bank has vertical, vegetation-free sides. With continued wave action, the exposed bank is likely to subside gradually into the river. The riverbank flora, and/or effects of erosion can be seen in Plates 9, 14, 15, 16 and 17.

In restricted stretches along the foreshore, a second sedge, *Scirpus* spp, is established in deeper water beyond the fringing *Juncus*, (Plate 16). In such situations, the river-bank is provided with an outer buffer zone, and appears to be well-protected from erosional forces.

2.3.6. Disturbed Areas Vegetated with Introduced Herbaceous Species and Remnant Trees

The final area identifiable on the basis of its cover vegetation, is the large open expanse occupying the remainder of the flood plain area. This area is covered by introduced grasses and weeds, and a sparse distribution of Flooded Gums and Paperbarks. The northern extension of this area is rough and undulating due to random dumping of fill material. It has in the past been grazed by animals, and old fence lines are still present. It now has a dense cover of tall weeds, such as wild oats.

Attempts have been made to maintain the southern portions of this area (behind Sandy Beach Reserve and fringing the foreshore), by mowing. The purpose of this exercise is unknown, however, it would have had the effect of reducing the fire risk and controlling the weeds.

2.4 Fauna

Observation of the study area on three consecutive days indicated that a range of birds utilized the wetland.

A list of those birds identified within the study area is given in Table 1.

Plate 14 Riverbank erosion at Sandy Beach Reserve.

Plate 15 Destruction of riverbank vegetation together with littoral zone, leading to severe bank erosion.

Plate 16 The exit point of the eastern drain into the Swan River. *Scirpus* spp forms a thin protective barrier in the shallow waters.

Plate 17 *Juncus maritimus* forming one of the few stands in the study area that remain in

Plate 18 "Clean" fill on the northern edge of the study area.

Table 1 Bird Species List for the Ashfield Flats Study Area, for the period 19-21 June, 1978.

Common Name	Scientific Name
Pied Cormorant	*Phalacrocorax varius*
Black Cormorant	*Phalacrocorax carbo*
White Ibis	*Threskiornis molucca*
White Egret	*Egretta alba*
White Faced Heron	*Ardea novaehollandiae*
White Necked Heron	*Ardea pacifica*
Mountain Duck	*Tadorna tadornoides*
Black Duck	*Anas superciliosa*
Grey Teal	*Anas gibberifrons*
White Eyed Duck	*Aythya australis*
Little Eagle	*Haliaetus morphnoides*
Greenshank	*Tringa nebularia*
West Swamphen	*Porphyrio novaehollandiae*
Coot	*Fulica atra*
Feral Pigeon	*Columba livia*
Welcome Swallow	*Hirundo neoxena*
Western Warbler	*Gerygone fusca*
Willie Wagtail	*Rhipidura luicophrys*
Silver Eye	*Zosterops australasiae*

Extended records containing such information are not available for the study area, and a long term survey was impracticable. However, a list of bird species present at the Belmont Shire refuse disposal site was compiled from July 1976 to September 1977, and is given in Table 2. As this site is less than 2 km down stream from the present study area, it is considered that such a species list is likely to be comparable with a similar comprehensive species list compiled for the Ashfield Flats area. Comparison of Tables 1 and 2 indicates that about half the species recorded at the Belmont Shire were present at the Ashfield Flats during those survey days.

Small crustacea were observed in the shallower, more vegetated waters of the flats. The drains and deeper flooded areas lacked visible small organisms such as crustacea, etc.

Vocalizing frogs were abundant, and a few small frogs were observed.

Mosquito larvae were found distributed throughout the area in small pools. The larvae of *Culex fatigans* were identified in peripheral pools on the western fringe of the study area. Such pools were presumably relatively fresh, as the breeding of this species is restricted to fresher water.

The larvae of *Aedes vigilax*, the salt marsh mosquito, were distributed throughout the flat in low density.

Adult mosquitoes, both male and female, were abundant, harbouring within the *Salicornia* spp and other vegetation types. Within the shade of the wooded areas female *Aedes vigilax* were found biting during the day. This cursory evidence suggests that the breeding of mosquitoes in the area, during the summer period, may cause a nuisance to the residents of the area.

Mosquito breeding in summer would be dependent upon the formation of pools by the tidal flooding of the area.

With respect to mosquito breeding it was noted that no fish (e.g. *Gambusia* species) were present in the waters of the area, either in the river, drains or flats.

Table 2 Bird Species List for Belmont Shire Refuse Disposal Site.
July, 1976 - September, 1977.

Common Name	Scientific Name
Pelican	*Pelecanus conspicillatus*
Little Grebe	*Podiceps novaehollandiae*
Little Pied Cormorant	*Phalacrocorax melanoleucos*
Little Black Cormorant	*Phalacrocorax sulcirostris*
Pied Cormorant	*Phalacrocorax varius*
Black Cormorant	*Phalacrocorax carbo*
Australian Darter	*Anhinga rufa*
White Ibis	*Threskiornis molucca*
Straw Necked Ibis	*Threskiornis spinicollis*
White Egret	*Egretta alba*
Little Egret	*Egretta garzetta*
White Faced Heron	*Ardea novaehollandiae*
White Necked Heron	*Ardea pacifica*
Black Swan	*Cygnus atratus*
Mountain Duck	*Tadorna tadornoides*
Black Duck	*Anas superciliosa*
Blue Winged	*Anas rhynehotis*
Grey Teal	*Anas gibberifrons*
White Eyed Duck	*Aythya australis*
Little Eagle	*Haliaetus morphnoides*
Black Shouldered Kite	*Elanus notatus*
Greenshank	*Tringa nebularia*
Black Winged Stilt	*Himantopus himantopus*
Red Necked Avocet	*Recurvirostra novaehollandiae*
West Swamphen	*Porphyrio porphyrio*
Dusky Moorhen	*Gallinula tenebrosa*
Coot	*Fulica atra*
Silver Gull	*Larus novaehollandiae*
Crested Tern	*Sterna bergii*
Feral Pigeon	*Columba livia*
Pallid Cuckoo	*Cuculus pallidus*
Welcome Swallow	*Hirundo neoxena*
Tree Martin	*Petrochelidon nigricans*
Australian Pipit	*Anthus australis*
Magpie Lark	*Grallina cyanoleuca*
Western Warbler	*Gerygone fusca*
Willie Wagtail	*Rhipidura luicophrys*
Stripled Pardalote	
Silver Eye	*Zosterops australasiae*
Australian Raven	*Corvus coronoides*
Kestrel	*Cerchneis cenchroides*
Reed Warbler	*Acrocephalus australis*
Little Grass Bird	*Megalurus gramineus*

2.5 Man's Impact

Two drains approximately 2.5 metres wide and normally 1.5 metres deep, traverse the area. (Plates 10, 12).

Although their purpose is to provide a means whereby storm-water runoff can be directed into the Swan, it is probable that they do have a local effect on the drainage of the flats. In summer, they would tend to drain the flat, whereas in winter, with large quantities of road runoff water, they would tend to increase flooding. They also provide a means of access to the wetland area for a variety of pollutants, some of which may include disease-carrying organisms, (e.g. bacteria and viruses), fuel and oil (from vehicles), sediments and nutrients. Litter was one visual pollutant which was definitely carried to the area by the drains.

At three sites, on the periphery of the study area, land fill has been dumped. The fill consists of predominantly soil and rubble, however, materials such as scrap metal and tyres are not uncommon. Plates 11 and 18 show examples of these fill areas.

In low-lying areas where fill has been deposited, or the natural vegetation disturbed by clearing and excavation, the Bulrush *T. orientalis* is abundant (Plates 9, 10, 11 and 12).

The central area of the *Salicornia* flats, east of the drain, is heavily scarred with tracks caused by vehicular traffic. Such disturbance has damaged the vegetation. Furthermore, because the vehicles have the effect of compacting the soil, regeneration of the vegetation is inhibited. The tracks create large pools that contain water for considerably longer than is normal on the flats area. Due to the permanence of the water, such pools may become mosquito breeding habitats - particularly during the spring and summer period.

The wide-spread occurrence of car bodies and a variety of litter, are all evidence of man's influence on the area (see Plates 7 and 11).

The general condition of the Swan River foreshore, in the Ashfield Flats area, is poor. In most cases the entire foreshore vegetation has been disturbed and, as a

result, erosion is prevalent (Plates 6, 9, 14 and 15). All areas are affected by the wash from boats. Further pressure is focused on the western section of the flats foreshore because of the local hydrodynamics of the Swan (see Section 2.2).

Much of the vegetation was recently burnt. Whilst this is not necessarily detrimental to tree species (provided the occurrence of fire is not too frequent) the spread of *Typha* spp and other exotics (e.g. *Paspalum* spp and couch grass), is enhanced.

Through past agricultural practices, and latter day maintenance (mowing, etc) the eastern flats area has undergone extensive change; e.g. native vegetation has been replaced by introduced grasses.

2.6 Concluding Comment

The Ashfield Flats study area can be naturally divided into two sub-areas on the basis of elevation and inundation (and hence vegetation).

The western section, although degraded by man's impact upon it, is still extensively vegetated by natural wetland species. It is tidal mud flats such as these that aquatic invertebrates occur in the greatest abundance. These areas provide important food sources and refuge for water and bush birds. The value of the area as a wetland resource is also increased by its close association with the Swan River which provides a path of access to the area, and a marked variation in wetland habitat.

Two storm-water drains cross this western section. The longer of the two, in particular, creates an artificial barrier. It must be stressed that such an artificial barrier does not represent a boundary distinguishing the extensive and degraded *Salicornia* flats to the east, from the natural sedges to the west. The drain unnaturally separates the two areas. The *Salicornia* flat is a very important component of this small wetland. With tidal flooding it provides a large habitat for benthic fauna. The importance of the *Salicornia* flat is reflected in the use made of it by wading birds.

The second sub-area, the eastern section, has been vastly changed, in terms of vegetation, by man's impact upon it, and

appears today as open space with no particular distinguishing features, except for its association with the Swan River and the fact that it is subject to occasional seasonal flooding.

3. FACTORS INFLUENCING FUTURE LAND USE ALTERNATIVES

Land use planning decisions are strongly influenced by environmental and human constraints imposed on an area. It is the aim of this section of the report to consider these constraints with respect to the Ashfield Flats.

3.1 Current Land Tenure

It is evident from Figure 1 that a large proportion of the Ashfield Flats is owned by the MRPA, and has been set aside for parks and recreation. The northern section is owned by the Bassendean Town Council. In addition, there are two existing reserves: Sandy Beach Reserve (for recreation) and an area in the south-west corner of the Flat reserved for the conservation of flora and fauna under Town Planning Scheme 3.

3.2 The Hydrological Nature of the Area

Large areas of the Ashfield Flats are susceptible to tidal inundation and/or winter flooding and thus play an important part in the hydrological regime of the Swan River. These factors must be considered in planning land uses requiring the construction of permanent facilities.

3.3 Wetlands : A Diminishing Resource

Wetlands have been traditionally regarded as unproductive waste lands, and as such, they have been altered in many ways to support a variety of land uses. In Western Australia, large numbers of wetlands have been drained for the purposes of agricultural activities, housing and industrial development schemes. It has been estimated that approximately 200,000 hectares of land representing 75% of the wetlands on the Swan Coastal Plain have been altered in these ways. Of the remaining 65,000 hectares, Riggert (1974) has estimated that about 40% are potentially reclaimable using existing techniques. Since this estimate, the pressure placed on these areas (which are the most biologically productive ecosystems per unit area), and their associated fauna, has continued. (For example, see : Guidelines to the Conservation and Management of Wetlands in Western Australia, Department of Conservation and Environment, 1977).

About one hundred species of birds depend on Australia's wetlands. The existence of some of these species has been placed in jeopardy, as populations have been reduced to critically low numbers, e.g. the Freckled Duck (*Stictonetta nacrosa*) (Riggert, 1974); the Blue Winged Shoveler (*Anas rhynchotis*) and the Brown Bitten (*Botaurus stellaris*) (Faunal Studies of the Northern Swan Coastal Plain, Western Australian Museum, 1978).

Furthermore, under the 1974 Ramsar Convention, Australia has an international obligation to conserve and manage wetlands so that the long-term survival of a large number of migratory birds is ensured.

3.4 Protection of, and Compatibility with, the Swan River

Because of the high value placed upon the Swan River as a natural resource (see Forbes and Fitzhardinge, 1977) it is imperative that the choices of land use activities for the Ashfield Flats be compatible with the goals of river protection and preservation.

3.5 Concluding Comment

With the above factors in mind, the types of land uses that could utilize the Ashfield Flats region are restricted to :

1. those that conform with the MRPA's policy on parks and recreation areas;

2. those that accommodate for, or are not affected by, periodic flooding;

3. those that accept the importance of wetlands and the Swan River as valuable natural resources, worthy of protection.

These constraints eliminate activity alternatives such as residential, industrial or commercial developments, or utilization of the Flat as a waste disposal and reclamation area.

The land uses seen as acceptable considering the above factors are conservation (of a viable wetland unit) and recreation (both passive and active).

4. RECOMMENDATIONS FOR FUTURE LAND-USE OF ASHFIELD FLATS

4.1 Proposed Reserve Region

Recommendation 1: Extend the flora and fauna reserve area in the western section of the Flats, so as to include all areas covered by wetland vegetation, including the Samphire Heath (Figure 1, overlay).

Justification: Recommendation 1 protects those areas utilized by wetland fauna, and is in accordance with the general comments made in Section 3.3. The extensive Samphire Heath area (east of main drain) is seen as an important component of the wetland unit.

Recommendation 2: Maintain the existing hydrological variability of the foreshore, buffer zones and proposed wetland reserve, by prohibiting the construction of drains, levee banks, retaining walls, etc.

Justification: Recommendation 2 is included so as to prohibit the future construction of drains or levee banks which would further influence the extent and frequency of flooding. The productivity of wetland ecosystems is increased by periodic tidal and seasonal flooding.

Recommendation 3: Construct litter filters at the top ends of the two drains that run through the Flats.

Justification: Recommendation 3 is designed to effectively reduce the amount of litter which flows down the drains from the residential areas.

Recommendation 4: Monitor the water quality of the drains for disease carrying organisms, fuel wastes, sediments, chlorinated hydrocarbons, organophosphates and other undesirable compounds.

Justification: While the presence of litter within the drains was obvious, other undesirable chemicals and bacteria may have been present. Recommendation 4 therefore, is included so that these elements may be detected. Results obtained by monitoring the water quality would help ascertain whether further filtering was necessary to protect the reserve area and river system.

Recommendation 5: Remove the refuse, car bodies, sheet iron, water tanks and other litter from within the proposed reserve boundaries, with minimal disturbance to adjacent areas.

Justification: The aesthetic appearance of the area could be improved considerably if this recommendation were implemented.

Recommendation 6: Attempt to revegetate the *Salicornia* spp flats within the proposed reserve extensions.[1]

Justification: Assuming that the proposed reserve can be protected from further damage, the situation still remains that the area has undergone extensive degradation, and it is felt that steps should be taken to upgrade some of the areas within the proposed reserve. The implementation of Recommendation 6 would achieve two purposes :

1. The visual appearance would be improved.

2. The natural productivity of the wetland would be restored.

4.2 The River Foreshore and Buffer Zones

Recommendation 7: Employ methods that will enable the natural sedge communities normally occupying the shallow fringes of the river, to re-establish.[2]

Justification: This recommendation should be regarded as having a high priority for a number of reasons:

1. to protect the river foreshore from erosion. The security of the river foreshore against erosion is largely governed by the fringing sedge and reed communities. In areas where healthy and continuous stands exist, much of the wave energy responsible for causing erosion, is effectively absorbed before coming in contact with the bank (Plate 16). Once the fringing vegetation has been removed, however, the rate of erosion is greatly accelerated (Plates 9, 14, 15).

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1. For technical data on revegetation of Samphire Heath areas see "Samphire for Waterlogged Salt Land" (1974) and officers of the West Australian Department of Agriculture.

2. For technical data on riverbank stabilization see "Waterways and Wetlands" (1976) and Swan River Management Authority.

2. to improve and diversify habitat. The presence of a fringing zone of vegetation has the effect of creating a littoral or shallow water zone. Once vegetation has been established, silt and organic matter are trapped in the foreshore and littoral regions of the river, thus improving the habitat conditions for wading birds, small crustaceans, vegetation, etc, and,

3. to improve visual amenity. Protection of the foreshore region using natural vegetation is preferable to any artificial means used to reduce erosion, because natural methods would be in accordance with the goals of river protection and preservation as outlined in Section 3.4.

Recommendation 8: Revegetate the region immediately behind the foreshore and the eastern boundary of the proposed reserve, with natural wetland species such as *Eucalyptus rudis*, *Casuarina obesa* and *Melaleuca rhaphiophylla* (Figure 1, overlay).

Justification: Natural areas of vegetation fringing the foreshore, function as buffer zones to the river ecosystem. In this way, they fulfil a number of important purposes:

1. They disperse the intensity of activities utilizing the foreshore area, and therefore minimize the impact, of people, on the river system.

2. They restrict access to the foreshore areas, and consequently help minimize the disturbance on the fringing river-bank vegetation which is essential if large-scale erosion is to be prevented.

3. Buffer zones help retain the aesthetic quality of the river.

4. They act as a filtering zone capable of reducing the input, into the river system, of a variety of urbanization products (e.g. household effluent derived from sewage and septic disposal systems, fuel and oil from vehicles, litter, nutrients from garden fertilizers, toxic chemicals from drains, etc).

   The creation of grassed parks necessitates the removal of natural vegetation, and as a result, the benefits derived from buffer zones are lost.

4.3 The Eastern and Northern Region

Recommendation 9: Construct playing fields for active recreation - levelling and using clean fill where necessary - in the eastern and northern sections of the Flats. (Figure 1, overlay).

Justification: When considering land use alternatives, it is important to take into account the natural or acquired attributes of the land in question. With respect to the Ashfield Flats, the main factor restricting the present choice of land use is the hydrological regime of the area. It has been established that it would be unwise to interfere with the flooding pattern (Section 3.2) and consequently, the choice of land uses must be restricted to those that would be least vulnerable to damage caused by flooding. Furthermore, the choice must be compatible with the above recommendations. It is for these reasons that active recreation is suggested.

Meaningful conservation of flora and fauna can only be undertaken in the western section. To conserve this area, active recreation must be denied. The eastern section, however, has little value from the point of view of conservation, and with the general upgrading of the grassed areas, the heavy local demand for active recreation facilities, could be reduced.

Extension of the active recreation areas so as to encompass the whole of the flats area is possible, through reclamation of the low-lying western section, however, such a step would totally destroy the conservation value of that area.

The hydrological function of the Ashfield Flats flood-plain must be taken into account in any development of the area.

Finally, passive recreation is compatible with both active recreation and conservation, and serves to maximise the utility of the Ashfield Flats.

5. CONCLUSION

The Ashfield Flats is a valuable area of open space. It is at present in a degraded state. The area does, however, have the potential to function in several ways. The north-western half - that comprising the swamp vegetation - is an important ecosystem type. Because of its close association with the Swan River, its value as a wetland resource is increased.

A broad band of wetland flora, established along the entire Ashfield Flats foreshore, would greatly enhance the visual attraction of the area. Furthermore, it would act as an effective buffer zone.

The remaining area is of little practical use in its present state, however, despite the flood risk, it has the potential to be developed so as to provide an area capable of supporting several forms of active recreation, providing developments are planned with attention to influence on water levels upstream during periods of winter flooding.

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