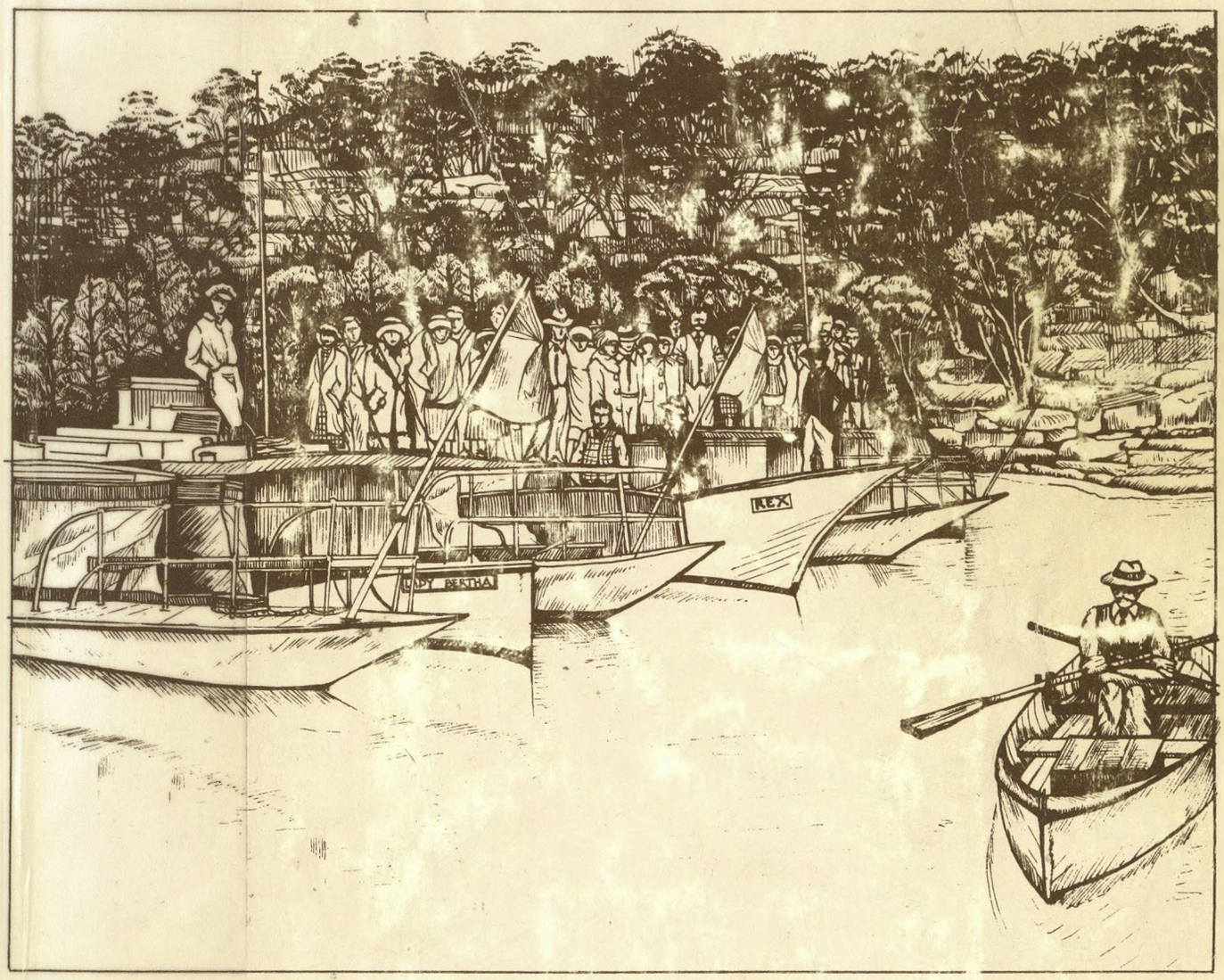
The Middle Lane Cove River
A History and a Future

Lynne McLoughlin



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THE MIDDLE LANE COVE RIVER

A History and a Future

LYNNE McLOUGHLIN

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COVER ILLUSTRATION BY ANNE HOPKINS

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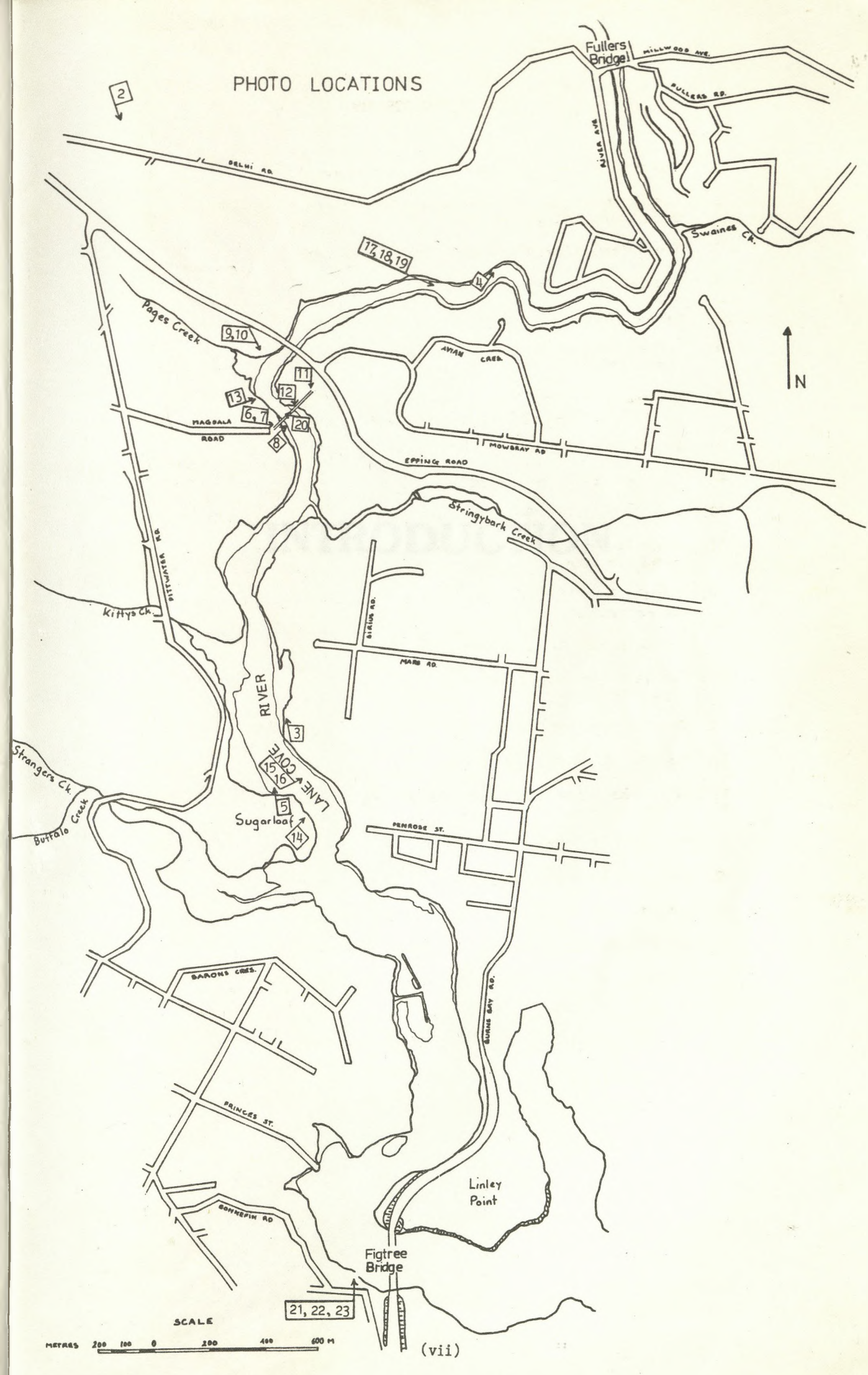
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INTRODUCTION

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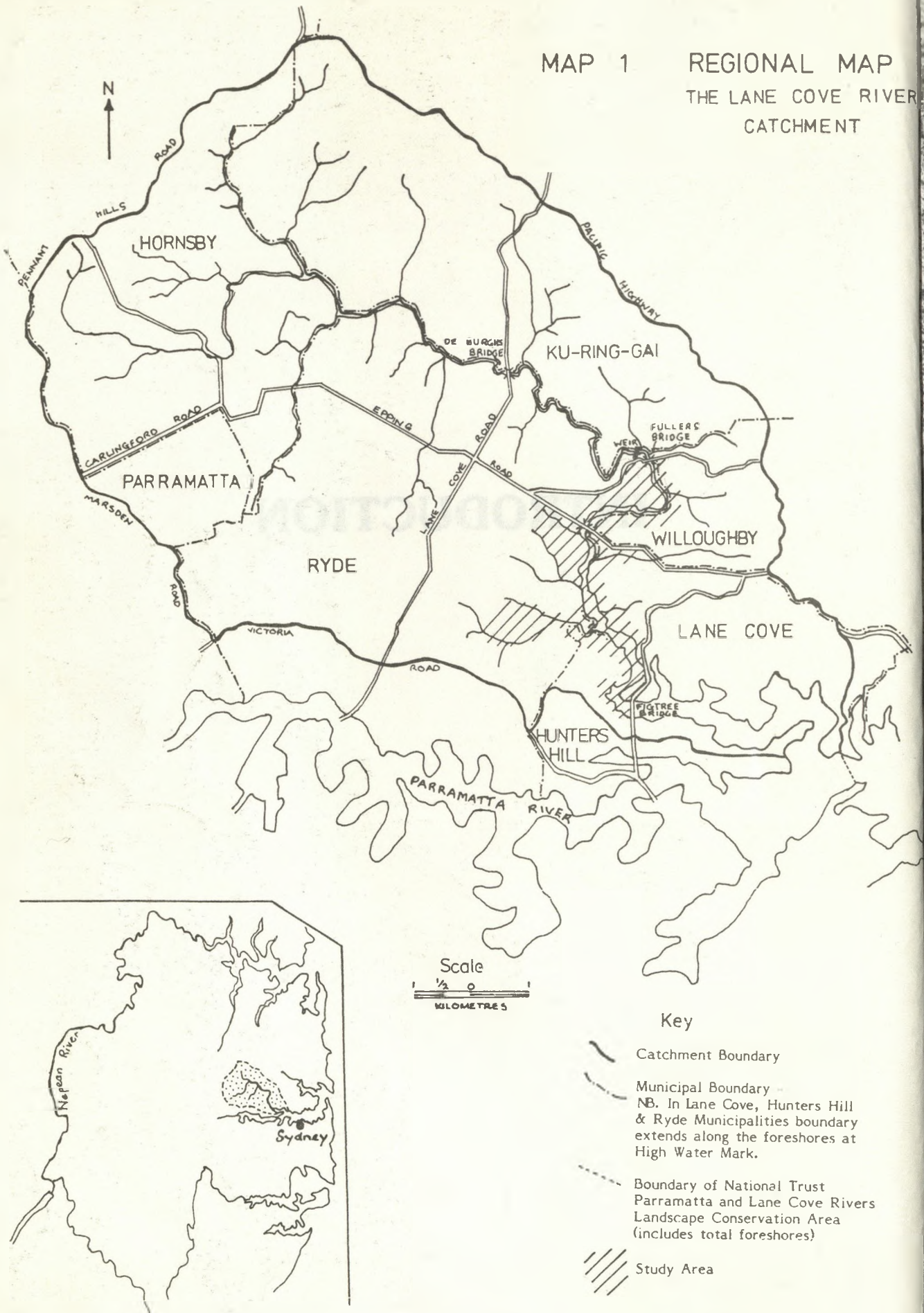
THE LANE COVE RIVER CATCHMENT



The Middle Lane Cove River
ourtesy of NSW Crown Lands Office)

INTRODUCTION

Aims

This study uses a small, defined geographical area to investigate patterns and processes of environmental change and the implications they have for future planning. The aims of the study are fourfold:

1. To investigate the degree to which the historical process, that is, past events and environmental changes, can or should be taken into account in planning management of an area.
2. To examine the way a multiplicity of interrelated issues, problems and events have impinged on, and shaped, this single study area.
3. To contribute a synthesised body of historical knowledge and understanding of this area.
4. To develop directions and proposals for future management of that area.

Too often the current state of the natural environment is taken as an absolute from which we only look forward in planning or assessing environmental impact while assuming its past nature. This is understandable in view of the recent nature of environmental interest and research and the paucity, or fragmented nature, of historical data. Yet, in Australia, white history is relatively short and it is thus often possible to trace the environmental changes caused by the impact of white settlement. This knowledge can give a far broader perspective to the process of developing goals and guidelines for future management than occurs when the present state of the environment is taken as the baseline.

This study will also challenge commonly held assumptions about the past nature of the physical environment and the changes which have taken place, by examining the environmental history of a relatively small study area. For example, the study will examine assumptions regarding the pre-white fire regime and post-settlement changes in the incidence and nature of fire, the pre-settlement extent of mangroves in the Sydney estuary, post-settlement changes in mangrove extent and their present role and importance, and the past nature of, and changes in, vegetation in the Lane Cove catchment. It will show these assumptions are far from correct and are based on inadequate, or no, research into the past nature of, and changes in, our specific Australian, or Sydney, environment.

The study will also show how, on a range of issues, from the purely physical to administration and management, an adequate understanding of past changes and events should play an important role in forward planning and decision making.

In the process of tracing the threads of environmental change the study aims to demonstrate the variety of interrelated problems, issues, events, people and governmental interests which have interwoven to produce the characteristics of this remnant natural area today - the agents of devastating change, the opportunities grasped and lost, the effect of political whim, environmental ignorance and recent environmental consciousness.

However, the final result of the study must be the creation of a framework for the future in the light of the lessons, perspectives and recommendations provided by the exploration of the area's past.

Scope of the Study

Geographically, the study area is defined as the Lane Cove River, its foreshores and adjacent bushland between Figtree Bridge at Hunters Hill and Fullers Bridge, Chatswood (Map 1) and Photo 1. This area could be termed the middle Lane Cove River as the areas above and below it are now distinctly different. However, over much of its history, the river above Figtree was called the Upper Lane Cove River while today the division between upper and lower valleys is often made at the limit of tidal influence, the weir in the State Recreation Area upstream from Fullers Bridge.

The area selected is an excellent example of a remnant natural area including a waterway, an important resource in an urban context. This is a waterway with a settlement history dating back prior to 1800 and an area in which considerable environmental change can be traced, yet today retains a narrow but significant vegetated area of natural appearance (Photos 1 and 2).

The area also amply demonstrates the problems of a multiplicity of interests operating within a small area and of drawing boundaries along rivers. This relatively

small area is part of four local government areas, ten state government departments and authorities own or control land or installations or otherwise have a direct interest in the valley, seven conservation groups and three progress associations have a direct interest in at least segments of the area. These organisations, councils and government departments are listed in Appendix I.

Historically, the study covers the period from first white settlement in the Sydney region to the present, and thence projects into the future.

Further, in the process of examining the study area and the forces which have affected it, the area must also be placed within its context at various levels - as part of the rest of the river and its catchment, the Sydney region or even wider and within various administrative contexts.

A discussion of the approach taken in the study and the data sources is found in Appendix II.

Structure of the Study

The objective of **PART** I of the study is to investigate exactly what environmental changes have taken place in the study area over the period of white settlement. Thus it is largely a descriptive environmental history of the study area. It synthesises much data from many sources to, firstly, propose a picture of the study area prior to the impact of white man, taking 1788, the year of the foundation of the colony, as a convenient point of time. Secondly, it details, as accurately as possible, the changes which have taken place since that time with analysis of reasons for those changes. Chapter 2 deals with the first century (the late 1780's to the late 1880's) while Chapter 3 deals with the second century on a range of changes affecting the river, its foreshores and bushland as a whole. Chapter 4 then takes a number of individual parts of the river in a case study approach, to illustrate how these changes took place in particular areas. Thus it is also able to enlarge on some issues only touched on in other parts of the study such as the roles played by local conservation groups and their relationships with local councils.

Apart from laying the foundation for the remainder of this study, Part I also makes the important contribution of a synthesised body of historical knowledge about this area, hitherto largely ignored as the outer edge of various local histories (Anon 1938, Levy 1945, Russell 1966, Geeves 1970).

The objective of **PART II** is to explore a range of issues which have strong impact in the study area. These encompass a range of fields - biological (mangroves, fire in the bushland), legal (alienation of urban parkland), political and urban (the freeway) and recreational and administrative (the park concept). They are examined in terms of their historical development, the present situation and the implications or recommendations for future development.

PART III seeks to build upon the conclusions and perspectives developed in Parts I and II to develop proposals for the future of the study area. Chapter 10 examines the resource particularly in terms of recreation - its value, the need for it and its possibilities and constraints for various activities. Chapter 11 proposes overall guiding concepts for planning as well as specific physical development. It details difficulties of implementation and explores the possible ways of administering such plans and proposals.

The Physical Resource

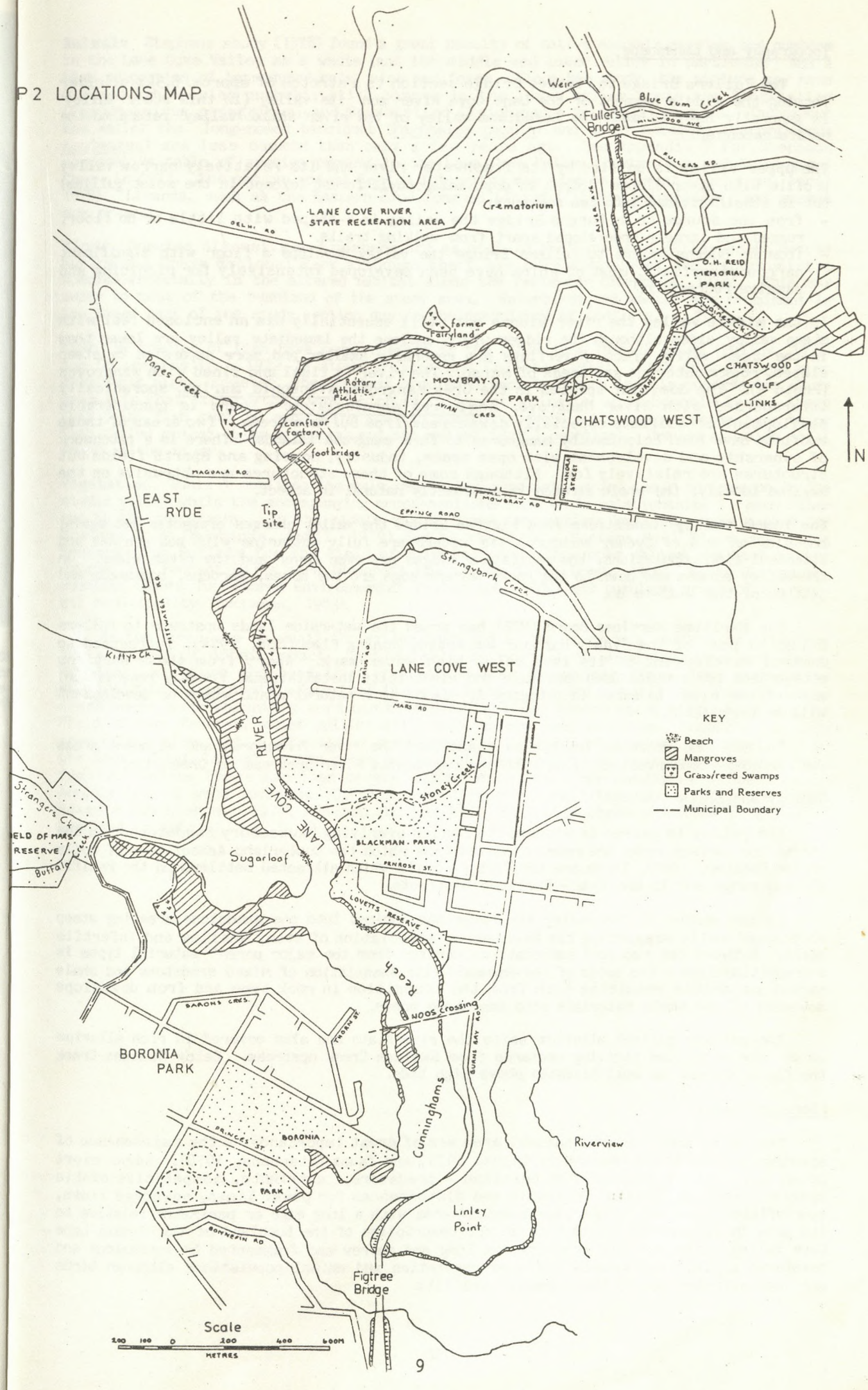
An adequate, detailed study of the bushland resource of the whole Lane Cove Valley has not yet been done although the upper part of the valley is better served than the lower. There have been some overview studies (Bradstock & Fitzhardinge 1979, National Parks and Wildlife Service 1983) and some studies of individual areas, for example in the lower valley, Mowbray Park (Buchanan, April 1979), Field of Mars Reserve (Ryde - Hunters Hill Flora and Fauna Preservation Society, 1976), Stringybark Creek (Howard and Associates, 1981) and areas in Ryde Municipality (Shearer and Jenkins, 1979) (Map 2 shows the areas and municipalities mentioned). There have been bushland surveys by the National Trust for Willoughby Municipality (1981) and Ryde Municipality (1982) and studies of specific aspects eg. mammals and birds (Stephens, 1978), waterbirds (Eskell, 1981), pollution (SPCC, 1980), fish (Pulley, 1977, 1980) and sedimentation (Carey, in prep.).

A general description of the study area is an obvious prior requirement for this study. However, it is not part of the purpose of this study to undertake a detailed physical resource appraisal.

PHOTO 2. The Waterway and Its Surroundings from Epping Road Bridge Downstream.
Industry, residential areas and services crowd in on the little remaining bushland. The proposed freeway will cut a large swathe through most of the bushland shown on the west (right) bank.
(Photo courtesy of Ian Brown, former Manager, Lane Cove River SRA)

PHOTO 3. Colonisation of Shoreline by Mangroves.
Waterworn rocks in the middle ground indicate former shoreline. Walkers here now only see glimpses of the river through the mangrove fringe.

P 2 LOCATIONS MAP



Topography and Landscape

The Fullers Bridge to Figtree Bridge section is a stretch of approx. 6.5km of river forming the middle segment of the Lane Cove River and its valley (in this study 'valley' is generally used to mean the immediate valley of the river while 'Valley' refers to the entire catchment).

The upper valley is unified by its freshwater river and its relatively narrow valley profile with steep slopes clothed in dry sclerophyll forest (except in the moist gullies) but is itself divided into two segments:

- from the source to De Burghs Bridge the valley is V-shaped with little or no floor, rugged and largely undeveloped apart from walking trails.
- from De Burghs Bridge to Fullers Bridge the valley develops a floor with significant narrow riverflats, most of which have been developed intensively for picnicing and passive recreation.

In **the middle valley** the river widens but still essentially has an enclosed feel with steep valley sides although the ridges which enclose the immediate valley are lower than in the upper valley tract. Riverflats are generally smaller and more separated by steep slopes, rocky outcrops and areas of marsh. The river is tidal and lined with mangroves (Photo 3). The dominant species is the Grey Mangrove, Avicennia marina, sporadically interspersed with River Mangrove, Aegiceras corniculatum. There is considerable development of mudflats especially downstream from Buffalo Creek. Two areas of these mudflats have been colonised by mangroves to form mangrove islands. There is a patchwork of ownership and development with open space, industry, housing and sports fields but structures are relatively few. Although some of these structures are obtrusive on the skyline locally, the whole stretch is dominantly natural in aspect.

The lower valley Downstream from Figtree Bridge the valley changes character yet again, becoming an arm of Sydney harbour. Its waters are fully estuarine with sea grasses and attendant fish populations, the separating ridges are even lower and the river wider. On the valley slopes and down to the rocky waters edge are the homes, gardens, boatsheds and jetties of the well-to do.

The Maritime Services Board (MSB) has zoned the waterside lands upstream to Fullers Bridge as part of the Sydney Harbour Waterside Zoning Plan (MSB, 1974), introduced to control development of its land below high water mark. Apart from those sections categorised for special uses (sewerage and electricity installations, freeway reservation) most of the river is zoned in category A, "lands in a natural state where no development will be permitted".

In 1983 the National Trust also classified the river foreshores and adjacent areas for Landscape Conservation, along with the Parramatta River upstream of Greenwich.

Geology and Soils

The valley is carved in Wianamatta Shales overlying Hawkesbury Sandstone. On the ridges the surface rocks are remnant shales from which the Cumberland Association of soils derive (Walker, 1960). These are the fertile soils which attracted settlers on the Pacific Highway ridge and in the Ryde - Eastwood districts.

In the centre of the valley the river has incised into the sandstone creating steep slopes and walls supporting the Hawkesbury Association of stony shallow and infertile soils. Between the two soil associations derived from the major parent material types is a transition zone - the soils of the Hammondville Association of mixed sandstone and shale parent materials resulting both from the transition in rock type and from downslope movement of the shale materials onto sandstone areas.

The gullies collect alluvium while the riverflats are also covered in rich alluvium which once supported thriving orchards from Swaines Creek upstream. Below Swaines Creek the flats are not as well elevated above high tide.

Flora and Fauna

The shape and size of a natural area are of great importance to the maintenance of species of both flora (Buchanan, August 1979) and fauna (Stephens, 1978). Edges exert urban destructive pressures on bushland - predators, nutrients, competitive exotic species, dumping, tracks and trails and disturbances for power lines, sewerage lines, sportsfields and fire trails. Any bushland area with a long edge or perimeter relative to its area is vulnerable and this is an apt description of the bushland of the middle Lane Cove Valley. Its bushland remnants are long and narrow and fragmented by intrusions and development. This has greatly affected vegetation and animal populations although birds are less affected due to their greater mobility.

Animals Stephens study (1978) found a great paucity of native mammals species and numbers in the Lane Cove Valley as a whole (and the middle and lower valley in particular) and a high proportion of introduced rats, mice and foxes. Since her study, the picture may have altered but species probably still common in the lower valley areas are Ring-tailed (Pseudocheirus peregrinus) and Brushtailed (Trichosarus valpecula) possums. Throughout the valley the long-nosed bandicoot (Parameles nasuta) and spiny anteater (Tachyglussus acuteatus) are less common than only a few years ago. See Appendix V for Stephens comparative table of species present in the Lane Cove Valley, Bantry Bay and Ku-ring-gai Chase in 1977. The native rodent Rattus lutreolus may also be present (Buchanan, April 1979). Lizards, such as the Eastern Blue Tongued Lizard (Tiliqua scincoides), and snakes are present.

Birds Species diversity and numbers are as high in the Lane Cove Valley as in nearby Kuring-gai Chase National Park although there are more introduced and opportunistic species especially in the altered habitat along the perimeter (Stephens, 1978). This may apply to most of the bushland of the study area. Waterbirds and waders are prominent in the lower part of the study section due to the prevalence of mudflats.

Fish 52 species of fish have been reported in the river in a 1976-77 study (Pulley, 1977) and 55 species in a 1972-73 study (Paxton and Collett, 1973). Fish numbers are also relatively high. However, the greatest species diversity occurs largely outside the study area - in that part of the river which is fully estuarine ie. up to Boronia Park. Above this point fish must be euryhaline and the diversity drops - the main species here being flat tailed mullet (Liza argentea) and sea mullet (Mugil cephalus). Prawns are also still found in the river.

Vegetation Table 1 outlines the main vegetation associations and their occurrence in the middle valley while the accompanying cross-sections show their relationships to each other and to the topography. In the middle valley these associations have only been mapped for Mowbray Park (Buchanan, April, 1979) and by the Ryde - Hunters Hill Flora and Fauna Preservation Society for the Field of Mars Reserve. The upper valley has been better covered ie. Pennant Hills park (Beecroft Cheltenham Civic Trust, 1976), South Turramurra bushland (South Turramurra Environmental Protection, 1980) and bushland areas of Ku-ring-gai Municipality (Buchanan, 1983).

As the areas are so small the native bushland in the study area suffers heavily from the problems of urban impact, particularly in respect to weed invasion and abuse. Nutrient, moisture and seed input via stormwater flows into creeks and puts weeds precisely in those spots where they flourish best - the moist gullies. Even in those areas where much voluntary work has been done by local groups eg. Mowbray Park and the Field of Mars Reserve, moist gullies still have severe weed problems. Probably the only area of any size little affected by weed invasion is the old Fairyland bushland, due to the lack of settlement on the ridge above and the care of the bush taken by the Swan family. Unless there has been severe disturbance the drier sandstone slopes remain largely free of weed invasion. Other sources (Bradstock and Fitzhardinge 1979, NPWS 1983, Adamson and Buchanan 1974, Adamson and Fox 1982) deal with these and other problems of bushland in detail.

TABLE 1 VEGETATION ASSOCIATIONS IN THE MIDDLE LANE COVE VALLEY

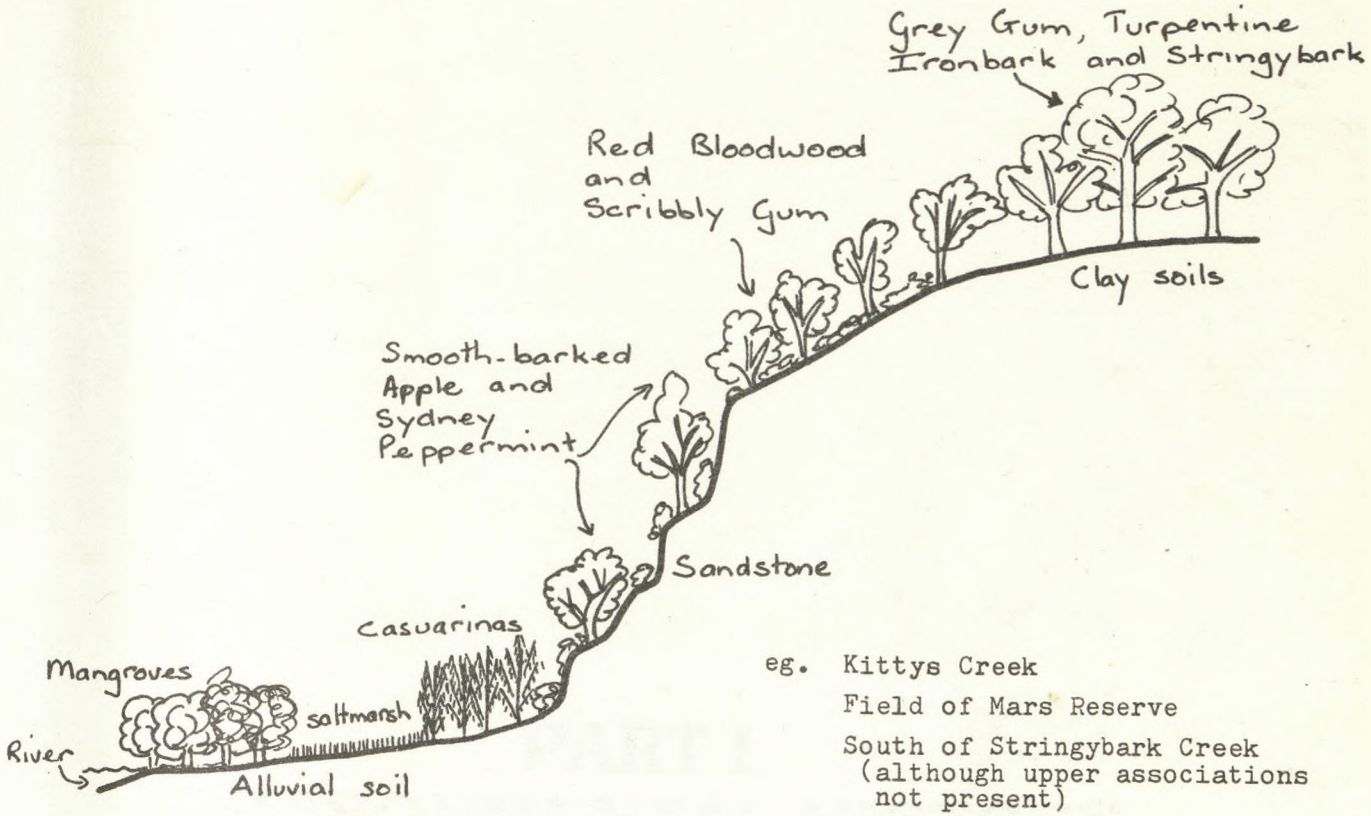
ASSOCIATION	VEGETATION STRUCTURE	SOIL	PARENT ROCK*	SITUATION	RARITY
Mangroves	N/A	saline alluvium	HS & WS	River banks and mud flats subject to regular tidal inundation, 0.4-0.6m above mean sea level. Most of the banks Figtree to Fullers, larger patches in mouths of creeks eg. Buffalo and Kittys.	very common
Saltmarsh & Reed Beds - Samphire, Scirpus, Phragmites/ Juncus, Sand Couch, Glasswort.	marsh/ swamp	saline to brackish alluvium	HS & WS	Low floodplain subject to frequent inundation, 0.8-1.0m above mean sea level. Saltmarsh more saline than mangroves (small patches Buffalo & Kittys Cks; Mowbray Park). Reed beds less saline than mangroves (Pages Ck., Mowbray Park).	once common, now only in small patches
Casuarina Fringe	woodland	saline alluvium	HS & WS	On soil with high salinity - behind mangroves eg. Mowbray Park; associated with saltmarsh, on slightly higher ground eg. to south Stringybark Ck.	moderately common
Freshwater Marsh	marsh	Hawkesbury or alluvium	HS	Result of seepage lines in sandstone shelving - Fairyland	rare
Sydney Blue Gum	wet sclero-phyll	Cumberland & upper Hammondville	HS & WS	Shale slopes and valleys but thinning rapidly close to ridges or on deep alluvium eg. Buffalo Ck.	now relatively rare
Grey Gum-Ironbark-Stringybark-Turpentine	wet sclero-phyll woodland	Cumberland	WS	Deep clay ridges and slopes. eg. Twin Road Forest, Nth Ryde, upper parts Buffalo & Strangers Cks.	rare
Moist Gully Flora - Port Jackson Fig, Coachwood, Water Gum, Christmas Bush, Blueberry Ash	wet sclero-phyll/ rainforest	all soils	HS & WS	Sheltered situations - under cliffs and in gullies. Suffering worst weed invasions.	common
Blackbutt	transit'l wet - dry scl'phyll	Hammondville & Hawkesbury	HS & WS	Shale slopes and wet sandstone valleys with alluvium eg. Mowbray Park. Pockets of deeper soil on sandstone valley sides eg. Cunninghams Reach.	fairly common
Scribbly Gum - Red Bloodwood	dry sclero-phyll woodland	Hawkesbury & lower Hammondville	HS	Ridges and adjacent sideslopes in the midst of Smooth Barked Apple association, usually with poorer drainage. eg. Field of Mars Res., both sides Magdala Road.	moderately common
Red Blood-wood, Narrow leaved Apple, Stringybark	dry sclero-phyll w'dland	Hawkesbury & lower Hammondville	HS	Higher sandstone slopes eg. north-east of Magdala Rd.	uncommon
Smooth Barked Apple - Sydney Peppermint, often with Red Bloodwood	dry sclero-phyll forest & woodland	Hawkesbury & lower Hammondville	HS & WS	Side slopes of most valleys where there is extensive rock outcropping, pockets of shallower soil. Major remaining association.	common
Heath - Kunzea & Banksia erifolia	heath	Hawkesbury	HS	Exposed ridges on virtually skeletal soils. eg. above Epping Road near lower Stringybark Creek.	rare

*HS = Hawkesbury Sandstone
WS = Wianamatta Series: shales and some related sediments.

Based (with adaptations and expansion) on Table 8, p.21 Lane Cove River State Recreation Area Plan of Management National Parks and Wildlife Service of NSW, 1983.

DIAGRAM 1 Vegetation cross-section - exposed sandstone slope

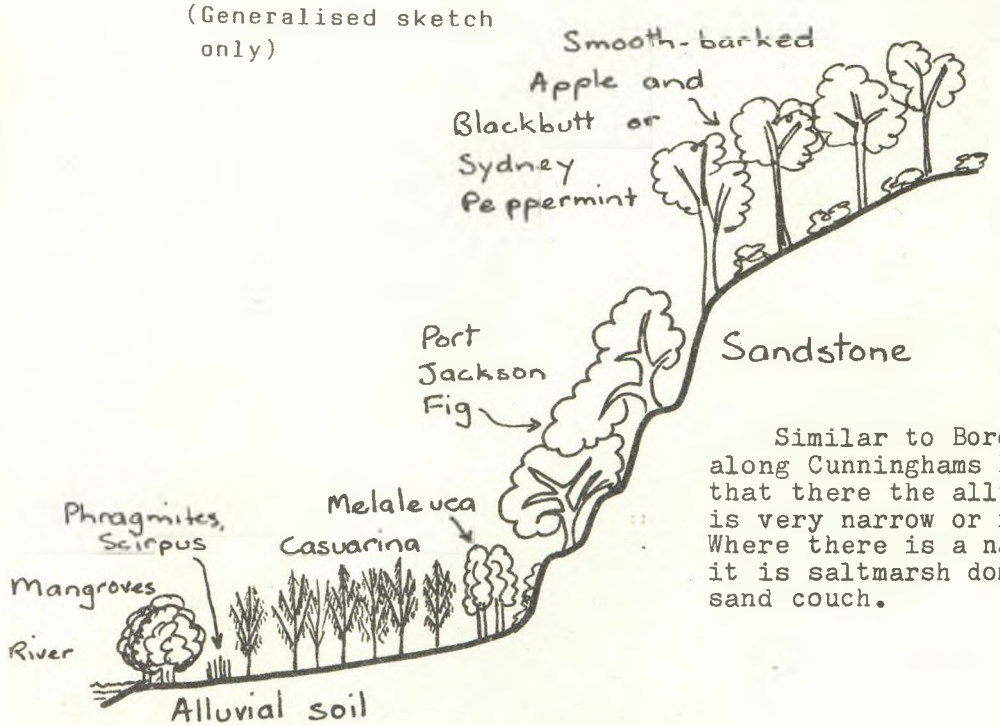
(Generalised sketch only)



eg. Kittys Creek
Field of Mars Reserve
South of Stringybark Creek (although upper associations not present)

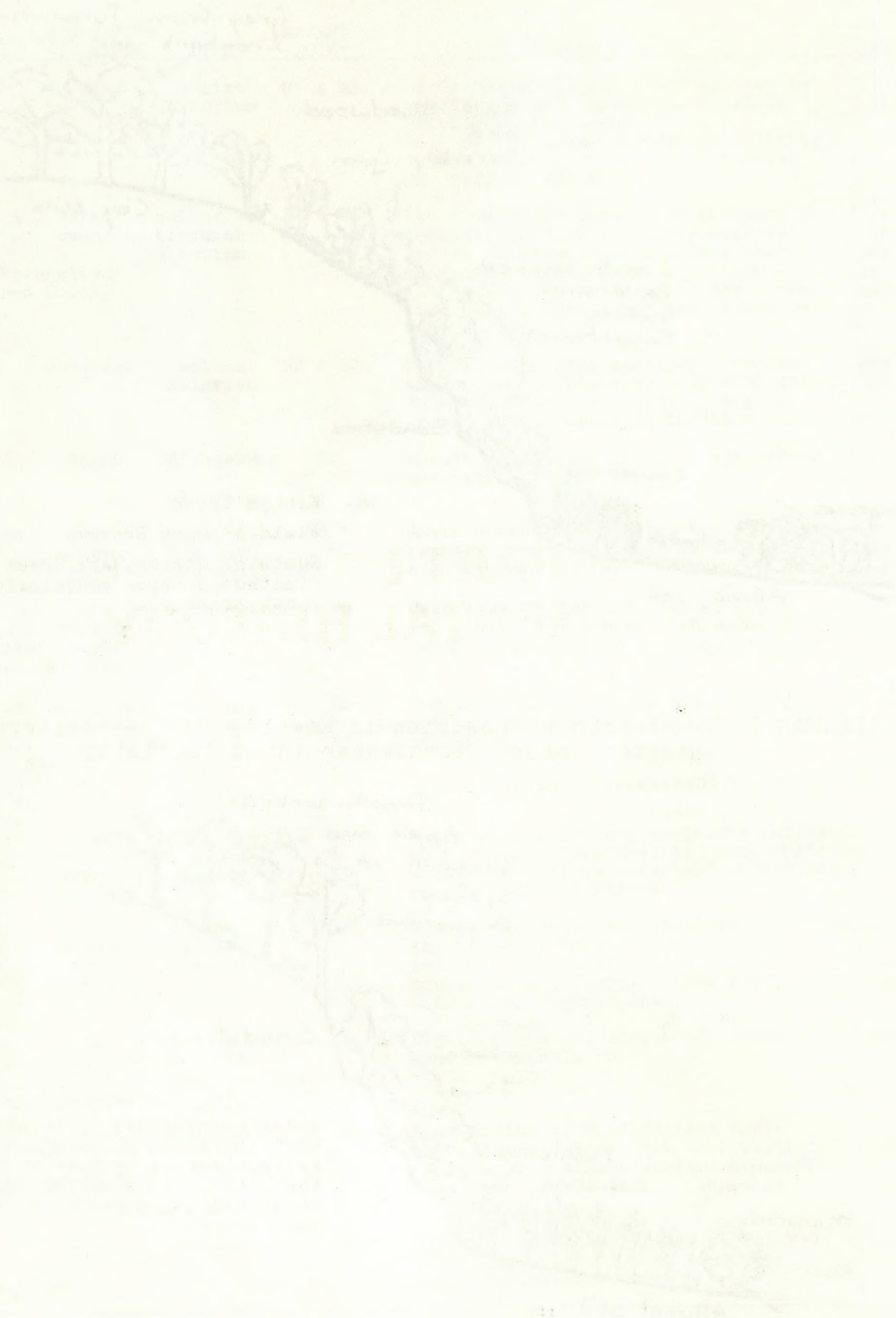
DIAGRAM 2 Vegetation crossection in Mowbray Park - sheltered sandstone slope, freshwater input to flats.

(Generalised sketch only)



Similar to Boronia Park along Cunninghams Reach except that there the alluvial zone is very narrow or non-existent. Where there is a narrow section, it is saltmarsh dominated by sand couch.

Diagrams adapted and extended from Lane Cove River as a Teaching Resource, SPCC and Department of Education, 1980, p.29.



PART I
ENVIRONMENTAL HISTORY

CHAPTER 1

IN 1788

1.1 Along the River

This chapter provides a picture of the river and its foreshores at the time of white settlement. It is a reconstruction working backwards from the earliest maps (1831 and 1847), photographs (1890's) and descriptions (1880's and 90's). Despite the importance of the river as a tributary of the Parramatta and to the timber supply of the early colony, there is no descriptive record in the well known historical records of early settlement - the journals and letters of the officers, surgeons and the governor. Most of the extant accounts of early expeditions in the area concentrate on contacts and transactions with the aborigines (apart from natural curiosity and the importance of friendly relations for survival, this was also the period of romantic fascination with Rousseau's "noble savage").

The river at this time was wider than at present as there has been considerable reclamation and 'natural' accretion since (see Ch. 4). Along most stretches of the river the difference would only be of the order of 2-4m on each bank (see Photo 3). However, in other places, such as the mouth of Stringybark Creek, at Sugarloaf and Linley Point, the original configuration of the land and location of high water mark was quite different to that of today. There were also outcroppings of rocks in the river, notably just south of Stringybark Creek and just downstream of Fairyland, and probably a number of sandy spits upstream from where the Epping Road bridge now stands.

The shores of the river consisted predominantly of the sandstone bluffs and steep rocky hillslopes dominated by Smooth Barked Apple (Angophora costata) and Sydney Peppermint (Eucalyptus piperita) typical of much of Port Jackson (Photo 4), sandy beaches, some mangroves and grassy flats, saltmarsh, freshwater marsh behind low levees and reed beds. The grass swamps and reed beds were found in areas of depostion such as the mouths of the various creeks entering the river. They also at least edged the point bar deposition of the sites of the former Magdala Road tip (Photo 11), the Chicago flourmills and Mowbray Road Athletic Field (Map 8), and the River Avenue area south of Fullers Bridge. The degree of salinity of these areas (whether the swamps were behind levees or fed by creeks) determined whether the species were freshwater or saltwater marsh species.

Extrapolating from a small area of swamp remaining in Mowbray Park, it is probable that some species were Phragmites australis, Scirpus sp., Atriplex hastata and Samphire (Salicornia quinqueflora) (Buchanan, April 1979). Associated with the marsh areas, in the slightly higher and drier parts such as the levees, Swamp Oak (Casuarina glauca) and Paperbark (Melaleuca linarifolia) were common. This association is illustrated in Photo 6.

There is little evidence of the existence of mangroves along the river at this time. Mudflats and grass swamps are detailed on maps but there are no mangroves at all shown from Stringybark Creek upstream and only patches below. On the 1831 maps (Maps 3 and 4) mangroves appear only in the straight stretch upstream from Figtree while later maps and photos show gradually increasing numbers of mangroves[1]. Little happened along the river in the first century of settlement which was likely to result in major destruction of mangroves. Thus it is probable that, in 1788, the stretch just upstream from Figtree already had significant sedimentation with mudflats and mangrove islands but elsewhere there were very few.

Deposition and associated vegetation varied with distance up the river. Near Figtree were mudflats of fine silt, exposed at low tide, on which had developed some mangrove islands. Between approximately Buffalo Creek and Swaines Creek was mixed mud and sand at, and slightly above, high tide level which developed marshes and reed beds at the edges. Above Swaines Creek deposition was more sandy in the bed of the river (coarser particles are deposited earlier in a stream's flow) while the banks, which had built up well above high tide level, were overlain with fertile alluvium.

The nature of the 'original' vegetation on the flats behind the grass swamps in the middle section and on the fertile flats higher upstream is unclear. A number of "grassy flats" are marked on the 1831 maps and Plummer (1896)[2] refers to the "large open spaces on the upper part of the river" being "the scene of the Bora" of the Aborigines[3]. It would be expected that such depositional soils above high tide, which later supported thriving orchards, would have supported native tree species but there is no record found yet of the

PHOTO 4. Remnant of the Former Shoreline.
Once typical of the steeper banks of the river - slopes of Sydney Red Gum and Sydney Peppermint forest and occasional sandstone cliffs dipping steeply into the water.

PHOTO 5. River vista.
Typical of the views once available up and down the river. Such extensive vistas are now rare due to high, dense fringe of mangroves and the denser growth of bush on the slopes.

early vegetation of these flats apart from those mentioned above. There is a location named 'The Three Oaks' on the 1831 map on the flats of the present Mowbray Park - probably indicating some large casuarinas. It is also recorded that the shingles of the roof of the Jenkins house came from timber on the banks of the nearby Blue Gum Creek[4] (shingles were usually split from casuarinas). William Henry, the first settler on Blue Gum Creek supplied timber billets for men o'war but there is no record of the species or exactly where they came from (Henry and Jenkins were early settlers near Fullers Bridge - see Ch.2).

There were also abundant fish, prawns, shellfish and oysters in the river during the summer months, especially lower down near, and below, Figtree. Captain Campbell, writing in February, 1788 observed "we found fish aplenty altho' the Harbour is full of sharks. There is a great quantity of shellfish in the coves that have mudflats at the bottom. Oysters very large."

Considerable quantities of these shellfish in middens have been found along the river which was an important source of food for the aborigines. They utilised many of the overhanging sandstone ledges along the river as shelters within easy reach of this food source, often with fine views along the river although these views may now be obscured by mangroves (eg. at the shelter in Mowbray Park).

The north shore, from the Harbour to Broken Bay and west to Parramatta was occupied by the Guringai tribe (Ross, 1976), broken into smaller clans, or hordes. Two subgroups are recorded as occupying territory on the northern shores of the Harbour but the boundary between them is unclear[5]. According to David Collins in his **Account of the English Colony in New South Wales** (1798) "those who live on the north shore of Port Jackson are called Cam-mer-ray-gal", yet Governor Phillip had written in 1790 to Lord Sydney that the territory from Sydney "Cove to Parramatta on the north side belongs to the Wallumedegal and is called Wallumetta". It is certain that the Wallumedegal occupied the western side of the Lane Cove River. They may also have ranged across the eastern side or the river may have formed a natural boundary between the Wallumedegal and the Cammeraygal.

1.2 Vegetation in the Catchment

Early descriptions of the environment of the North Shore were utilitarian, concentrating mainly on the suitability of the land for agriculture and the ease or otherwise of travel across it. There were few botanists among the first settlers and, as Burrel (1972) points out, the fashion in botany at the end of the 18th century was to describe new species rather than vegetation systems.

However, a general picture of vegetation in the catchment can be deduced from fleeting references and the early economic activities. At the time of white settlement the vegetation of the Lane Cove River catchment was dominated by tall timber species, very little of which remains today. These were a valuable resource for the early settlers bent on survival in a new world. They were found on the fertile Cumberland Association soils of the Wianamatta shale ridges, at the bottoms of the sandstone gullies where the soil from the ridges had washed down, and probably on some of the alluvial soils of the riverflats. They were possibly also found on some of the better areas of the transitional Hammondville soils.

The most valuable timber species were Blackbutt (Eucalyptus pilularis) which was most abundant, Blue-gum (E. saligna) for wheel felloes, Red Mahogany (E. resinifera) one of the best native hardwoods, Blood-gum or Red Bloodwood (E. gummifera) for fencing, Turpentine (Syncarpia glomulifera) for wharves and houses, Red Gum which furnished material for the wheelwrights trade and knees for vessels and Forest Oak (Casuarina torulosa) which supplied shingles for the settlers houses (Levy, 1947). Mangroves were used for stonemasons and cutters mallets but, in 1819, were noted as coming from Long Bottom, not the Lane Cove River (Earnshaw, n.d.).

This timber formed a continuous tall open forest of trees commonly 1.3 - 2.3m in diameter along the ridge of the (now) Pacific Highway from North Sydney to Hornsby with fingers extending down towards the river, most notably at West Killara which became a centre of the timber industry and its transport. Likewise in the western half of the catchment where the Eastern Farms and Field of Mars districts are described as covered with dense virgin forest of enormous trees, some of which were 300' (92m) and over and up to 50' (15m) in circumference at the base. They were estimated at 500-600 years old and the yield of one such giant was recorded as 6,000 superfeet of timber (Levy, 1947).

Remnants of the shale vegetation today are a Blackbutt - Sydney Blue Gum association. The Blackbutt is usually dominant but the Blue Gum is frequently co-dominant and, in some cases dominant (Kartzoff, 1969). Kartzoff speculates that the emergence of dominance or co-dominance of Blue Gums is a result of selective logging of the Blackbutt (Blue Gum had too many gum veins for widespread use) and, in some cases (eg. Duffy's Forest) subsequent

systematic firing of the forest which eliminated Blackbutt regeneration. Kartzoff thus sees it as likely that Blackbutt was originally more consistently dominant. However, George Caley, travelling across the northern ridges of the catchment in 1805 (NNE from Pennant Hills) described the trees as Blue Gum and She-oak in that area [6].

Whatever the dominant tree species, it is clear from frequent comments in early accounts that there was very little shrub understorey beneath these tall forests but, rather, grass and fern. For example, on the 15th April, 1788 Surgeon John White described the Frenchs Forest area (most of which is on Hammondville soils). After passing the swamp which is the source of the creek emptying into Dee Why lagoon

> "...we got into an immense wood, the trees of which were very high and large, with little under- or brushwood. The ground was not very good, although it produced a luxuriant coat of a kind of sour grass growing in tufts or bushes which, at some distance, has the appearance of a meadow land....[7]

It is possible that the lack of understorey was the result of lower light conditions of a relatively closed canopy. It is as likely, considering the mentions of smoke and fire and other reference to Aboriginal fire practices by many early observers, that it was the result of deliberate burning by aborigines.

The sandstone slopes of the central part of the catchment, originally carried a shrub understorey and many of the earlier explorations recount the rigours of traversing the "jumble of rocks and thick woods"[8] "whose stubbornness wore our clothes very much"[9]. This sandstone vegetation included heath on the skeletal soils of exposed ridges, open dry sclerophyll woodland with a great variety of understorey and ground species on the slopes, and denser growth with less species variety in moist gullies and other particularly sheltered situations. An indication of dominant species associations is given in Table 1.

The bushland remnants of today in the Lane Cove Valley are largely those of the sandstone slopes of the gullies and the river's valley. These have remained undeveloped due to rugged terrain and are probably at present similar to their state at the time of white settlement although more or less impoverished and undergoing species change depending on distance from urbanisation.

In summary, prior to white settlement, there was a much greater diversity of ecosystems along the foreshores of the study stretch of the Lane Cove River than exists today. On the mudflats in Cunninghams Reach there were deep green patches of mangroves but few mangroves any further upstream where rushes and grass swamps edged the river in the lowest parts. On the slightly higher areas were feathery casuarinas, white-trunked paperbarks, ti-tree, wattles, bracken fern and grasses. The river was wider and more open and clean in appearance with clear vistas down long stretches of the river from many vantage points (Photos 5 and 11). Sand became increasingly predominant as the bottom material and in beaches and spits from Stoney Creek upstream.

Between the patches of riverflats steep slopes of open woodland and cliffs of brightly coloured sandstone, broken by the curving Angophora trunks and ferns sheltering in moist crevices, dipped straight into the water. This dry sclerophyll forest carried a great variety of flowering shrubs and ground species and a profusion and variety of ferns in the sheltered places. The openness and colour of the vegetation of the slopes thus contrasted with the shade and deep greens of the rainforest species in the moist gullies.

Above this woodland were the tall forests of the clay ridges, consisting of trees of great size and age, no understorey and groundcover of grass and bracken fern while the more exposed sandstone ridges carried heath.

Notes and References

1. See bibliography of maps for details of maps consulted.

2. John Plummer was a journalist living in Northwood, Lane Cove around the turn of the century who kept files of newspaper cuttings on subjects which interested him. Three of these volumes of cuttings contain material relating to Lane Cove and the Lane Cove River - Vols. 48, 49 & 50 (Mitchell Library, copies in Lane Cove Library Local History). The material in Vol. 48 dates to the mid 1890's and includes several articles on the river written by Plummer himself, first published in St Ignatius College's magazine **Our Alma Mater** and later in the **Evening News.** The Vol. 49 dates to 1909-10, the period when a new ferry service was opening up the upper river.

3. "Upper", at this time, referred to the river above Figtree.

4. File on William Henry and Thomas Jenkins, Lane Cove Library Local History.

5. Subgroups did not have boundaries as such.

6. George Caley **Account of a Journey to the Sea in 1805.**

7. **Journal of a Voyage to NSW** by John White, Surgeon General.

8. Lieutenant William Bradley's Journal 17.4.1788, describing Lieutenant Ball's track from Upper Middle Harbour to Greenwich Point.

9. George Caley, op cit.

CHAPTER 2

THE FIRST HUNDRED YEARS

2.1 Early Exploitation

The first three enterprises in the Lane Cove Valley were to directly exploit and extract its three obvious natural resources and they had varying impacts.

1. Grass The grassland understorey of the north shore forests and the grassy flats along the river were prolific and provided an abundance of feed for the stock and horses of the infant colony. Landings were made at various places along the north side of the harbour and the Lane Cove River and the inland grasslands were worked over from Blues Point to Hornsby. Forty or more men were employed to keep a stream of boats plying across the harbour and eventually a stockade was erected at the head of Woodford Bay, Longueville (where its wells and runnels can still be seen) from which gangs of cutters were sent out each day (Anon, 1938).

Such grass cutting probably had little impact on the pre-existing vegetation systems. Harvesting grass probably acted in the same way as the frequent burning by aborigines of these areas had done - kept the ridges open for ease of travel, encouraged new growth for herbivores and possibly even kept down shrub invasion as any establishing seedlings were either cut or trampled.

2. Timber Timber getting was a major industry throughout the catchment in the first 50-60 years of settlement and continuing on a minor scale long after that. The best and most abundant species on the shale ridges were cut and transported to wharves on the Lane Cove and Parramatta Rivers for transport to Sydney on $2^1/_2$-3 ton boats (Harris, 1847).

Government sawpits were established very early in the timber of the shale ridge at West Killara on (the now) Fiddens Wharf Road (see Map 3). Timber was seen to be getting scarce here by Governor Macquarie on a visit in 1810 and the government sawing establishment was soon moved further up into the catchment. By the time of the 1828 Census, the timber of the middle and lower Lane Cove Valley was being taken out largely by timber contractors employing mainly emancipists (Earnshaw, n.d.). Very little record remains of this industry, prevalent throughout the catchment. Along the river sawpits are shown near Pages Creek on the 1831 map and a newspaper articles of the turn of this century describe some remnants of the industry in large old sawpits and gigantic tree stumps still existing along the river.

Charcoal burning was also an early industry on the Field of Mars Common. Kittys Creek and Buffalo Creek were fairly reliable sources of fresh water and made convenient places for the timber getters and charcoal burners to camp. The 1831 map (Map 3) shows two huts on Kittys Creek upstream from the present Pittwater Road.

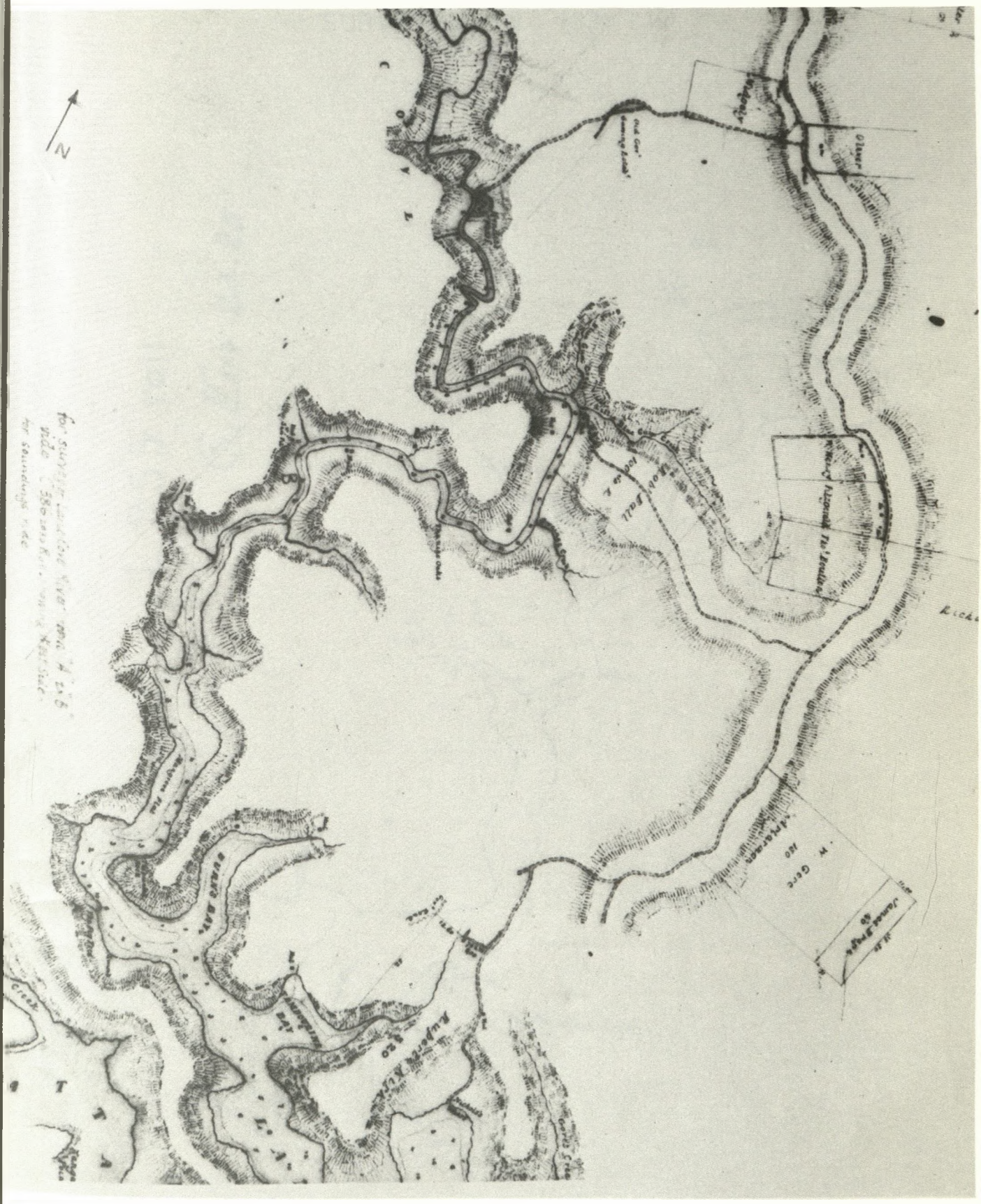
The effect of the timber trade on natural vegetation varied. At first it was merely selection of the best and most useful trees and, while opening up the forest canopy and creating disturbance, would have left younger and smaller trees, as well as the senescent trees to perpetuate the forest type. It was selective of species and eventually may have altered the variety or balance of species in some areas. This applies particularly to the slopes and gullies where only a few of a commercial species may have occurred.

Later, when settlement spread along the ridges, the timber industry was a means of clearing land for farming and large areas of forest began to disappear. Over time, the areas of forest which remained were worked over and over, first for timber and later for firewood, particularly the common land of the Field of Mars. The effects of this by 1861 can be gauged from the following excerpts of evidence given to the Select Committee of the Legislative Assembly appointed in December, 1861 to inquire into the Field of Mars Common[1]:

> "In its present state, owing to the timber having been cut over and over again, the roots have thrown up numberless saplings and low scrub which has destroyed the grass that might have been on the ground when it was open forest."
>
> Jules Joubert

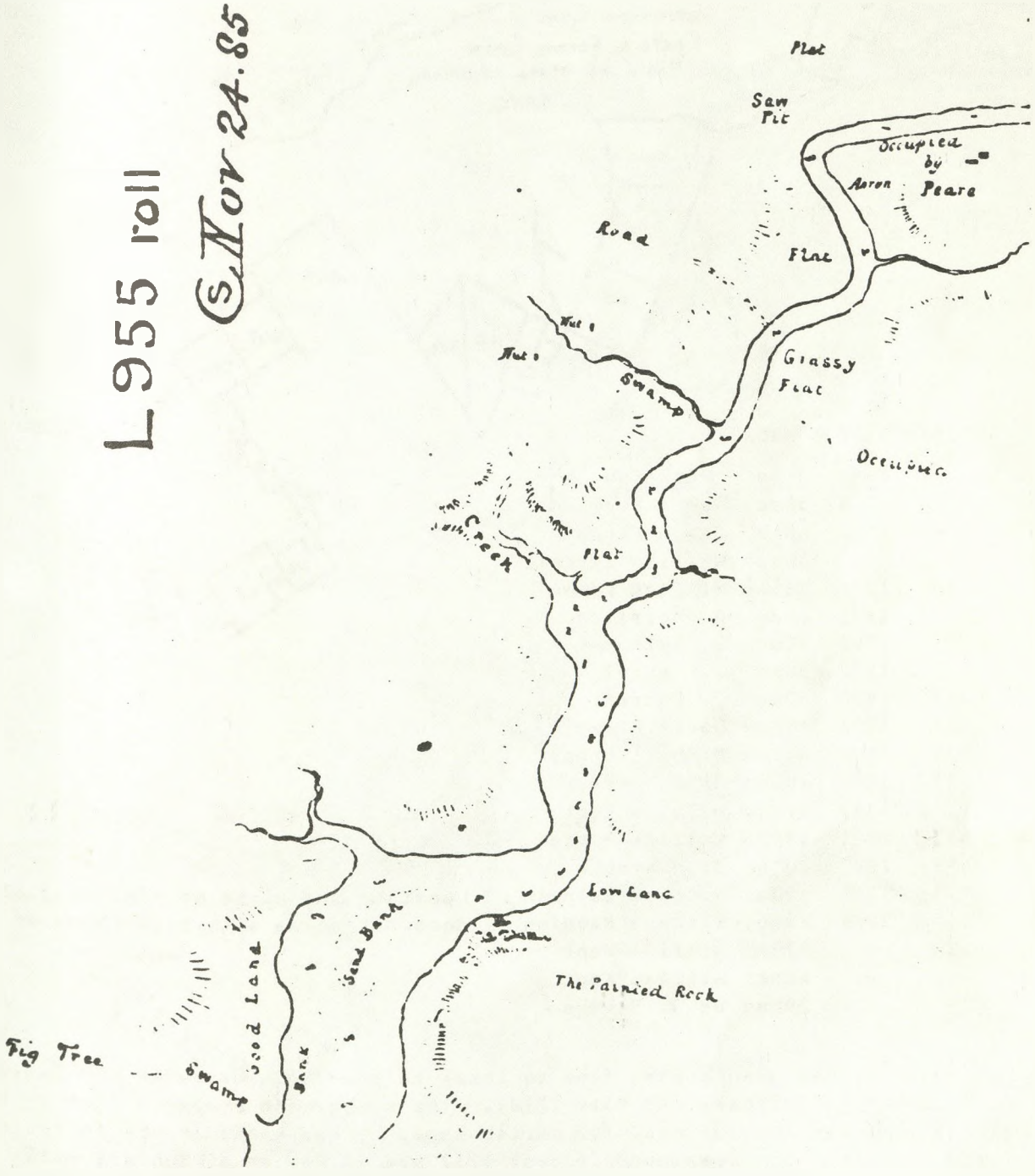
> "The original timber having been cut away entirely, a kind of scrub or underwood has sprung up with the saplings, the saplings have been cut down, the scrub has become denser, and the pastureage has been destroyed"
>
> James Squire Farnell

MAP 3 LANE COVE RIVER, NORTHWOOD TO KILLARA, 1831



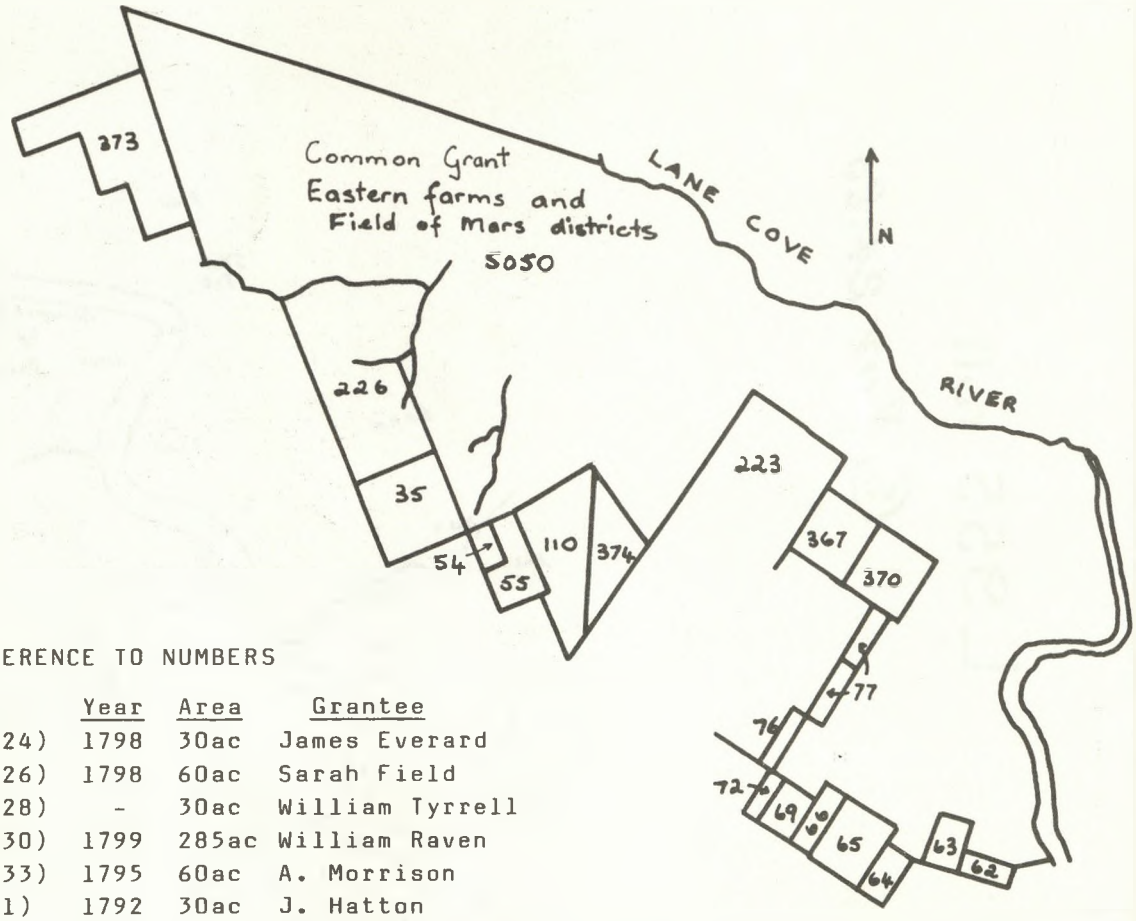
Shows the river, its main channel and cliff line with huts and sawpits. Mangroves are shown on flats near Figtree. There is only one grant anywhere along the river at this time despite the obvious occupation. The more fertile Lane Cove Road (Pacific Highway) ridge has more grants but there were few roads, or tracks, from the ridge down to the river.
(Source: AO Plan 1090, Survey of the Lane Cove River to its Source)

MAP 4 DETAIL OF PART OF THE LANE COVE RIVER SURVEYED IN 1831



Source: AO 2/4992 Surveyor Larmer's Fieldbook of his Traverse of the Lane Cove River, 1831.

MAP 5 EXTENT OF THE FIELD OF MARS COMMON



REFERENCE TO NUMBERS

No.		Year	Area	Grantee	
62	(124)	1798	30ac	James Everard	
63	(126)	1798	60ac	Sarah Field	
64	(128)	-	30ac	William Tyrrell	
65	(130)	1799	285ac	William Raven	
66	(133)	1795	60ac	A. Morrison	
69	(11)	1792	30ac	J. Hatton	
72	(10)	1792	30ac	J. Laurel	
76	(32)	1800	30ac	J. Courant	
77	(41)	1802	150ac	David Brown	
370	(43)	1804	140ac	Michael Connor	
369	(42)	1804	100ac	J. Weavers	
223	(139)	1803	570ac	William Kent	
374	(44)	1801	140ac	William Moore	
110	(45)	1801	200ac	John Brabyn	
55	(53)	1794	100ac	William Balmain	) Location and shape of these two bloc
54	(46)	1796	25ac	Richard Harding	) does not agree with that shown on
*35	(18)	-	170ac	William Kent	parish map
*226	(16)	-	460ac	William Kent	
373			290ac	Dr J. Sevage	

Notes This map has been copied from an inset to the 1847 survey of the Field of Mars Common by Galloway (AO Plan 2718). The numbers in brackets (not on the original) indicate portion nos. for parish maps. Those marked * are in Parish of Field of Mars. The remainder (except 373) are in Parish of Hunters Hill. The 1847 map was copied from the original deed in possession of Mr T. Sheppard of Kissing Point, dated 11th August, 1804. It stated that Governor King grante to David Brown, Francis Okes and James Squires, 5070 acres, more or less, from the northeast corner of lot 62, Eastern Farms, bounded by Lane Cove and a line to Government allottment No.2 of (?illegible) chains. On the south and west sides, by the Government and other allotments granted up to this date.

MAP 6 PART OF 1847 SURVEY OF FIELD OF MARS COMMON

Shows river, cliff line, swamps (ψψ), mangroves (Ω) and encroachments on many of the flats along the river (numbered and keyed to names and comments but key is only partly legible). Comment on the slopes west of the river: "Poor stony soil the timber nearly all cut down for firewood for Sydney". (Source: AO Plan 2718, Survey of the Field of Mars Common, by Galloway)

At this time Joubert estimated that the only people gaining benefit from the Common were firewood cutters and, once a year, those cutting Christmas Bush. He had an excellent view of the river from his house at Figtree and had previously counted in one day 5 boats of 3 to 5 tons which went up with one tide and down with another laden with wood. He presumed these came from the Field of Mars as there were always large stacks of wood to be seen on the edge of the river awaiting transport.

As soil was also being removed from the Common, probably the alluvium of the river flats, the natural vegetation of the entire west side of the study area changed considerably during this first century. Hibble (1916) also refers to the removal of humus from the bush, early in the first century, for fertilisation of farms and orchards.

3. Lime The need for lime for Governor Macquarie's great building programme resulted in exploitation of the shell deposits found along the northern shores of the harbour and along the Lane Cove River. The exploitation of the aboriginal shell middens resulted in the loss of much invaluable archaeological material.

2.2 Settlement

During the first century there was little development or settlement along the specific study section of river. By Larmer's 1831 survey there was only one land grant along the entire river upstream from Tambourine Bay - that of Robert Ball on the south side of Blue Gum Creek. There were, however, a number of huts (9) and land denoted as occupied along the flats between Kittys Creek and Little Blue Gum Creek, mainly timber getters. On the east side, they later applied for grants. On the west side, settlers merely squatted as it was all Common land and the 1847 map (Map 5) shows encroachments on most of the flats along the western shore.

This 1847 map (Map 6) also provides the earliest comprehensive detail of the nature and vegetation of the riverflats. Their extent is clearly shown between the shoreline and the cliff lines and grassed areas (flats or swamps) and mangroves are differentiated by symbol. Mangroves are shown as scattered trees or small clumps, mainly on the edges of the larger flats as far upstream as the area of stringybark Creek, and on two islands - near Figtree and in the mouth of Buffalo Creek. The nature of the areas shown with a grass symbol must be educed from the settlement pattern. The extent of encroachments is a better guide to settlement or land actually used than are grants which were meted out in regular blocks. Along the river areas of occupied land are delineated and numbered. It is reasonable to assume these areas probably supported a "shack" and subsistence gardening/crops and were relatively dry although subject to occasional flooding. Those flats areas shown as unoccupied were more likely to be saltmarsh, reed swamps and other grass swamps.

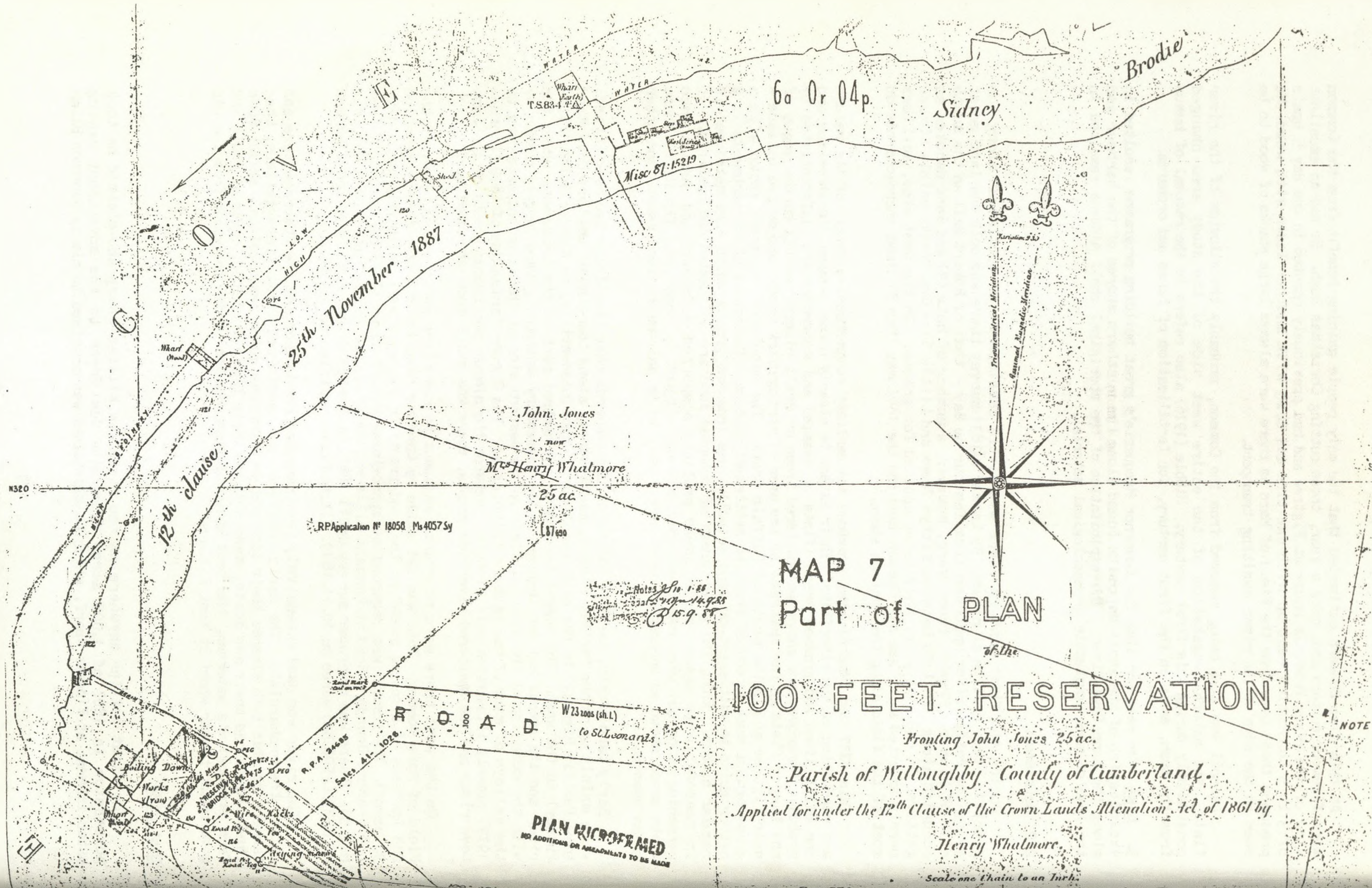
Early land grants, largely for farms and orchards once the timber had been logged, were mainly up on the fertile ridges, particularly along the line of the Lane Cove Road (now Pacific Highway) in the east and Eastern Farms (Gladesville) to Kissing Point (Ryde-Putney) in the west. The rugged terrain of the central part of the catchment, where the river and its creeks had cut through to the Hawkesbury sandstone, were largely passed by with the exception of the alluvial flats on the eastern side of the river and extending up the valleys of many of the eastern tributaries. The Gordon Parish Map of 1840 (Thorne, 1979) clearly illustrates this picture. Between the almost continuous grants of the Lane Cove ridge and the scattered riverside grants, there was still much ungranted land.

On the west there were no grants adjacent to the river as it was all part of the Field of Mars Common. This was set aside by Governor King in 1804 "for the preservation and increase of breeding stock" as the land grants in the west were relatively small (20-90 acres). The Common was regarded as approximately 5050 acres (2104 ha) extending from the present Boundary Road at Pennant Hills and North Epping to the Lane Cove River (see Map 5). There was no proper survey until 1847. A Deed of Grant was issued for a Common of 6235 (2598 ha) acres on 10.11.1849. It had been notified on 1.9.48.

The river was used extensively for transport for timber and the timbergetters and later, the orchardists. The early settlers were, perforce, first timbergetters, then farmers as this both cleared their land and provided some quick remuneration. Whilst some landholders had their own boats, many shipped their logs (and later, cases of fruit and farm produce) via watermen, the best known of whom was Joe Fidden operating from the old government timber wharf at West Killara.

East Side

The first settler anywhere on the river was William Henry who claimed he took possession in 1807 of 1,000 acres from Blue Gum Creek to the government sawing establishment at Fiddens Wharf, which he maintained was promised to him by Governor Bligh



MAP 7
Part of PLAN
of the
100 FEET RESERVATION
Fronting John Jones 25 ac.
Parish of Willoughby County of Cumberland.
Applied for under the 12th Clause of the Crown Lands Alienation Act of 1861 by
Henry Whalmore.
Scale one Chain to an Inch.
PLAN MICROFILMED
NO ADDITIONS OR AMENDMENTS TO BE MADE
COVE
6a 0r 04p.
Sidney
Brodie
25th November 1887
12th clause
John Jones
now
Mrs Henry Whalmore
25 ac.
R.P. Application No 18058 Ms 4057 Sy
Misc 87:15219
T.S.83-4
Wharf
Shed
WATER
HIGH
LOW
ROAD
W 23 2005 (sh.L)
to St Leonards
R.P.A. 24685
Sales 41-1026
Boiling Down Works
Trigonometrical Meridian
Assumed Magnetic Meridian
NOTE
N320

but which later governors persistently refused to recognise and so legalise the grant. This area he called Millwood Farm from which he supplied billet wood to men-of-war and planted a few vines and fruit trees. As he also supplied meat for government supplies he was probably grazing cattle on the grassy flats along this part of the river. He made several tracks in the area - two from his 40 acre grant on the Lane Cove Road (now Pacific Highway) to landing places on the river and his farm, another which became Fullers Road which linked his farm to Lane Cove Road and thence via his fourth track, which later became Burns Bay Road, to a deepwater landing place on Burns Bay.

In 1829 he was granted a lease of 1,000 acres from Blue Gum Creek down to Burns Bay along the entire east bank of the river up to Nichol's land - the first official claim over this land. However, Henry was only interested in his farm on Blue Gum Creek and the boat access at Burns Bay. Consequently he did little with most of his lease, except perhaps cut timber, but when the first grant was made to Robert Ball in 1830 it included the land he had developed at Blue Gum Creek and became a matter of considerable and long-running dispute although he was not ejected from the land of Ball's grant until 1850[2].

The area of alluvial soils raised above high tide level around Blue Gum Creek and Little Blue Gum Creeks and along the east bank of the river south to Swaines Creek became a major apple, pear and citrus growing region dominated by the Jenkins and Fullers families, both descended from William Henry. By the 1880's, the Jenkins orchards were well established to the north of Blue Gum Creek Road (now Fullers Road) on both sides of Blue Gum Creek and they retained the name of Millwood Farm given to the area by William Henry. The Fullers family pear orchards lay to the south, along Swaines Creek and the river foreshore almost to Fullers Road.

Further downstream, in the Stringybark Creek area, the first grant of 40 acres, straddling the creek, was made to Thomas Moore in 1832[3]. It was bought in 1865 by Henry Whatmore who built a dam on Stringybark Creek, probably to supply freshwater to his nearby slaughterhouse. In the 1880's Whatmore and John Berry had established their bone and tallow boiling down works on the river at the foot of the Mowbray Road West road reservation, on the site where the cornflour mills were later established (Map 7). The Whatmore family had acquired the riverside land from below Stringybark Creek around to what is now Mowbray Park, much of which was good flat land although swampy in parts on the edges.

Despite the lack of actual settlement, by the end of this first hundred years most of the land on the east side of the river, whatever its aspect, topography or usefulness, including most of the immediate water frontage was in private ownership. In approx. 1880 a 100' reservation[4] was placed along the east bank of the river from the vicinity of Fiddens Wharf to just south of Stringybark Creek, including the lower reaches of the tributary creeks. Landowners behind the reservation were later able to apply for this land if it had not been otherwise dedicated.

With such sparse settlement, the roads leading down to the river from Lane Cove Road on the eastern edge of the catchment were few and poor and ran down the main ridges. These were Blue Gum Creek (now Fullers) Road, Mowbray Road West and Burns Bay Road. Only Burns Bay Road actually reached the river in the mid-1880's, connecting to the new Figtree Bridge. Thus the Jenkins and Fullers orchards used river transport for their produce.

The implications of this relative lack of development along the river is that the river and its foreshores had also changed little apart from the effects of timbergetting and sedimentation of the river itself. These were a natural consequence of any development such as road-building and clearing of land for agriculture.

West Side

Geeves (1970) calls the 1880's "the watershed years" for the northern bank of the Parramatta River because, when direct road access to Sydney was opened via the Gladesville and Iron Cove Bridges, progress finally reached old settlements such as Ryde and "it began to engulf their familiar landmarks and established patterns of life so violently that nothing was ever quite the same again".

These bridges were made possible by the subdivision of the Field of Mars Common. Vast quantities of timber, bark, shingles, firewood and charcoal had been won over the years from the Common and carried down the river to Sydney but, by the 1860's, only firewood was left and the revenue from its leases was small. It was a highly controversial area of land - landholders, residents and cultivators had a right to use it but only those who lived nearby actually grazed a few animals there, or cut some firewood. At the same time it had a reputation for being inhabited by many drunken and disorderly characters. The charcoal burners were believed to consume great quantities of liquor while "there is a place called Buffalo where there are a number of woodcutters who bring

down women from Sydney - there is great rioting and debauchery carried on there" (quoted in Geeves, 1970).

Jules Joubert claims to have originated the proposal in 1853 for selling the Common to pay for the bridges over Iron Cove and the Parramatta River, calling a meeting and setting the issue alight (Joubert, 1889). Many of the people of Ryde then wanted the Common ceded to the Crown to pay for the bridges because of the difficulties of getting farm produce to the Sydney markets via the steamers or on the punt. However, another group of the Commoners violently opposed government takeover of 'the people's land'.

In 1861 the Select Committee was appointed "to enquire into various petitions and other matters relating to the Field of Mars and Eastern Farms Common, together with bridging over the Parramatta River and Iron Cove Bay". Due to the varied opinion and evidence it could not decide on the capabilities of the Common or likely benefit from the bridges. However, it could not see sufficient justification for public expenditure and the sale of the Common land would fall far short of the outlay needed. Thus they recommended subdivision in accordance with Commoners' rights.

Parliament agreed, deciding the bridges proposal was too expensive at £80,000 considering the small population in the Ryde district. However, nothing was actually done for some years. Then policy changed and James Squire Farnell, a keen supporter of the original proposal, became Secretary for Lands. The Field of Mars Resumption Sale Bill was passed in 1874, the bridges were built in the early 1880's and, in 1884, when drought had forced higher unemployment, 400 unemployed were engaged to clear the Common and lay it out in streets and allotments. Their work also included the construction of Pittwater Road and Ryde Council, taken with the idea of creating a large lake by heading the river with such a road, petitioned the state government to resume the head of the Lane Cove River as a water supply (which they declined to do) - probably the first of the many proposals to impound part of the Lane Cove River and resume its surrounds for public purposes.

The land went on sale in September, 1885 and proved most attractive (perhaps due to extravagant promises over the possible extension of trams to the area) fetching prices which surprised the older residents and brought an influx of a new type of resident. £70,000 worth of land was sold - a sum not far short of cost of the bridges and this sale was only of the southern part of the Common.

This subdivision was of all the Common land from the southern edge as far north as Cox's and Magdala Roads. East of Westminister Road the blocks were approx 1 to 2 acres whilst the remainder were mostly 3 to 4 acres. Most of the reserves now existing in this area, especially along the river, were proposed at this time[5]. The two major reserves - Field of Mars and Boronia Park were proclaimed for public recreation in 1887 but the remainder along the river were not notified until the 1920's and the two tiny reserves on Martins Creek were not notified until 1958.

The largest of these reserves was the Field of Mars (85 acres or approx. 35ha) adjoining 25 acres set aside for a cemetery. It was the government's solution to Ryde Council's agitation for provision of public parkland and the Council was asked to bear half the cost of this reservation. This they indignantly refused to do, claiming it was too far from their settlement of Ryde to be of use as parkland. Despite their refusal, the reserve was still set aside and Council accepted trusteeship in 1889 although they then took little interest in the land.

There was some logic to the areas chosen for reserves. As has always been usual in subdivisions, they were the areas unsuitable for residential development, being either too steep or the swampy land along the river. While the Field of Mars Reserve contained the steep-sided valleys of two creeks, the creeks were taken as convenient boundaries rather than what is now considered as more environmentally logical - the ridge line. Considering the topography and cliff lines, it is difficult to see why more of Buffalo Creek was not included, extending the reserve through to what is now Higginbotham Road (some was later acquired piecemeal to extend the reserve) and why the reserve along the riverfront from Boronia Park around to Pittwater Road was not made wider to include the cliff line. Undoubtedly the need to pay for the bridges had some bearing on these decisions.

However, it is to Governor King's original setting aside of the Common and the subdivision and sale of such a large area at one time with generous and, for the 1880's, far-sighted provision of reserves, that we owe the existence of a considerable length of bushland waterfront on the western bank of the Lane Cove River and the existence of some significant larger blocks of bushland.

The remainder of the land on the western side of the river, from Magdala Road around to Fullers Bridge, also part of the old Common, was not subdivided and put on sale until 1896 and 1898 with only the swampy riverside blocks between Magdala Road and Epping Road being reserved. The new subdivisions were put on sale in small lots and were not popular, some going up for sale several times before being sold[6].

2.3 Public Construction

The 1880's also saw considerable public expenditure on capital works along the river. In 1891, a 24 3/4 inch rivetted wrought iron water pipeline was constructed as a suspension aqueduct across the river (Photo 6) just north of the location of the present pipeline and footbridge. This was the first pumping main from the Ryde Pumping station to the Chatswood Reservoir to service the expanding settlement along the Pacific Highway ridge and the first of many service intrusions into the valley. This main soon proved to be of insufficient capacity and to have problems with its iron construction and a 30inch rising main in steel was constructed across the river in the present position on an arched footbridge in 1901. The older suspension pipeline was not then removed until 1945[7].

In 1885, the first Figtree Bridge was built. As the Gladesville bridge had been completed in 1881 and Iron Cove Bridge in 1882, the settlements along the Lane Cove Road (now Pacific Highway), as well as the Ryde and Hunters Hill districts, were now joined to Sydney by road, probably the most important factor in allowing the expansion of settlement of both east and west sides of the catchment.

Conclusion

Thus the changes of the first century, apart from the clearing of the forests on the ridges, were not dramatic. They were small scale, yet cumulative changes, the effect of which would not be felt until later in the second century. In particular, changes in vegetation and fauna, as well as sedimentation in the river, were quietly gathering pace although vegetation change was probably more obvious on the west side, as it was Common land. Thus it was more thoroughly and frequently worked over and the tall trees gave way to saplings and scrub.

By the end of this century the only settlement along or near the river was associated with the alluvial flats - the orchard areas from Swaines Creek upstream, the Whatmores and a few others on small pockets on both sides of the river.

The 1880's were the watershed years, not only for the Ryde district but the eastern part of the catchment also. They marked the transition from the slower pace of development and agricultural nature of settlement of the first century to the increasing rate of change and suburbanisation of the second century. In this decade a large section of the long-standing Field of Mars Common was subdivided and sold, Figtree, Gladesville and Iron Cove Bridges were built giving road access to the city, and a piped water supply established to Ryde and Chatswood. These were all important foundations of further development and population growth and, thereby, of environmental change along the river.

Notes and References

1. Progress Report published 14.1.1862, Final Report and Proceedings of Committee and Minutes of Evidence published 26.9.1862, AO 7/6056.

2. Committee re Petition of W. Henry, 1860. Report July, 1860 in **Votes and Proceedings of the NSW Parliament 1859-1860** Vol.4.

3. Howard & Assoc. (1981), based on work in Russell (1966), p. 49, state that this land was first granted to Veteran George Cadby in 1832 and the road made by Cadby from his grant to the Lane Cove River is referred to. However the parish map records the land as granted to Thomas Moore in 1832. Cadby's grant was at Lindfield on the Lane Cove Road (near the present station) (Lands Dept. Plan c20.690) and the road made by him referred to in Surveyor Larmer's reports was from that grant to the river between Little Blue Gum Creek and Blue Gum Creek.

4. The record of the date and reasons for this reservation have not been found. However, Lands Office plans of the 1890's of this reservation along the front of the now Mowbray Park and the Athletics Field indicate it was being surveyed in accordance with Circular 80/51.

5. Plan C36.2063, Lands Department. Kittys Creek reserves and the Magdala Road reserve (tip site) were not included.

6. Plans C1954.2030 - C1960.2030, Lands Department.

7. Maritime Services Board survey and records.

CHAPTER 3

A CENTURY OF CHANGE

This chapter will deal with environmental changes affecting the river as a whole, or factors operating over much of the study area in the second century. The following chapter illustrates these changes in particular sections of river.

At the beginning of this period the Lane Cove River above Figtree was highly regarded as a beauty spot and became increasingly popular, especially as a "poor man's" recreation area. Some contemporary descriptions:

> "Indeed it is doubtful whether there is any river more picturesque than that of the Lane Cove River from the bend which conceals the Parramatta to the point where it becomes a tiny streamlet, dancing and leaping among the grey masses of rock and time-worn boulders which seek to impede its course."
>
> (Plummer, Vol. 48)

On travelling from Figtree towards the head of navigation by launch:

> "It has taken us but an hour, and the distance, by the varied scenes which break in beauty at every corner and turn, give one the feeling of having travelled a full score of miles. It is a place for a landscape artist to rave about, it is a place for a poet to dream himself into ecstasies over."
>
> (Plummer, Vol. 49)

It was described as a "veritable fairyland" with "visitors being struck with the wealth of beauty spots the river contains and the diversified character of the scenery" passing from dense deep green mangroves on the flats near Figtree to sandstone bluffs highlighted by the curving Angophora costata; then the appearance of grassy flats and a variety of picnic spots interspersed with the steeper valley sides to the orchard area where "the banks for the space of a few miles are lined with fruit trees, the overhanging branches often touch the glassy water and you may pick fruit without even getting out of the boat". Past the orchards there were "bulrushes, waratahs and Christmas bushes extending to the waters edge" and then the scenery became more gorge like with rapids to be traversed towards De Burghs Bridge.

Even allowing for the hyperbole of journalism of the period, the river was obviously a very beautiful area with a richness and diversity of scenery and vegetation far greater than exists today.

3.1 Changes in Vegetation

John Plummer, in an article on the flora of the Lane Cove River[1], gives us some insight into the original richness of the shrub understorey along the river and its bushland with the profusion of wildflowers still to be found in the 1890's.

Above Figtree, he describes flannel flowers (Actinotus helianthi) as "in great profusion, being in some places as abundant as buttercups in an English meadow", the native rose (Boronia serrulata) as "very conspicuous in the bush" in spring and "in places the ground is almost blue with the native lobelia" (probably Lobelia gibbosa). He also mentions the beauty of Eriostemon salicifolius, Phebalium billiardieri, the native fuschia (Epacris longiflora), the sweet-scented twining Marsdenia and fast-growing Lyonsia (now Parsonia, probably straminea). Native Geranium and Native Arum (Arum typhonium) were plentiful, also various kinds of milkworts.

Plummer also speaks about the beauty, variety and profusion of ferns:

> "The creeping maiden-hair fern is found in many places, forming large luxuriant masses. The curly fern, parsley fern, and hare's foot fern are abundant in the more sequestered localities and here and there small tree ferns may occasionally be met with....The birds nest fern was somewhat common in the early days of the colony, but is now rarely met with. The same may be said of the lady fern. The blanket fern is plentiful, and the elk's horn fern has been occasionally found."

He indicates there were also many more varieties of fern, without common names, to be found. Ferns were picked in large quantities for sale and home and schoolchildren would

carry home large bouquets on the river ferry.

In another article in **Our Alma Mater**, the flora of the bushland of Riverview at the turn of the century is described. Appendix IV lists species given in that article (some of which are not listed in Beadle et al (1982)). A major study is required to assemble such pieces of historical evidence, as well as catalogue the species present today to make some comparisons. At present we have inadequate knowledge of the present species composition of vegetation of the Lane Cove Valley as a whole, and little knowledge of the past. An example of the value of historical evidence is Callistemon linearis, mentioned by Messer (1984) as a 'rare common plant' in Lane Cove, yet in the Riverview article as plentiful there at that time. However, this species has magnificent crimson blooms and was probably affected by commercial flower picking.

In "Then and Now on the Lane Cove River" (**Evening News**, 8.5.96), Plummer refers to the northern (or eastern) side of the Lane Cove River as a "leading source of Christmas Bush, waratahs and other native flowers, which were systematically collected and brought in boatloads to Sydney for sale". Christmas Bush (Ceratopetalum gummiferum) had also been cut systematically on the western side (Ch. 2) and is mentioned by Plummer as:

> "plentiful in numerous places and until within the last few years was to be seen everywhere. At Christmas time it was ruthlessly cut down in considerable quantities, and sent by boats to Sydney, the result being the disappearance of many of the larger trees."

Yet Christmas Bush is described by Buchanan (April, 1979) as very common in the upper reaches of the Lane Cove River but uncommon in Mowbray Park (implying this is its natural occurrence). This is a very obvious example of assumptions about the past based on present patterns. Present species distribution in areas so disturbed by urban influences cannot be taken as definitive of their natural, or pre-settlement, distribution.

There has been a slow, sometimes subtle, but significant impoverishment of the bushland, such as does remain. Weed invasion and rubbish dumping are obvious in their effect on the bush but the impact of the systematic free-lance mining of the bush over the years for everything it has had to offer is not as readily recognised. Felling of timber (commercial and for firewood), large-scale flower picking for sale, private flower picking, harvesting of Christmas Bush, removal of soil and humus removal of stone for garden rockeries by private and commercial collectors, cutting of Casuarinas for bakery firewood and for Christmas trees, digging up of plants for private gardens and, again recently, removal of logs for firewood - have all had a gradual but cumulative effect on the bushland with decrease in both species number and diversity.

However, assessing the effects of 'mining' of the bush is complicated by other factors which have been causing considerable changes in the remnant bushland of the Lane Cove Valley, especially the lower two-thirds, involving both change of species and loss of richness and variety. There have been no scientific comparative studies in the Valley, apart from the Valley's inclusion in Clements (1980) wider study and much of the evidence is largely observational, involving comparison of the bush today with descriptions and photographs of earlier periods. These changes are:

1. Change in species:
   a) Pittosporum undulatum and P. revoltum and some other moist gully species, have been favoured by lack of fire and are expanding into dry sclerophyll forest. Pittosporum is particularly opportunistic with strong rapid growth and, once established, can dominate an area with dense canopy which precludes shrub understorey and establishment of other seedlings. Areas of former open Angophora costata/E. piperita woodland with shrub understorey are evolving into Pittosporum forest with little understorey - the low diversity of moist gully flora. This has been noted by Adamson and Fox (1982). Such changes have also been documented for Melbourne's bushland by Gleadow (1980).
   b) The shoreline vegetation of the study area has changed from a variety of communities - dry sclerophyll woodland slopes, some mangroves, casuarina and melaleuca stands and various grass swamp communities - to the one community, mangroves, along most of the shoreline with remnants of the other communities sometimes still existing behind the mangroves. The changes in mangroves are more fully documented in Chs. 3.3 and 6.

2. Decline in richness, numbers and varieties of the understorey - this is particularly obvious in the flowering shrubs and small plants, such as flannel flower, which formerly constituted a large part of the charm of the sandstone vegetation in the catchment.

This decline can largely be attributed to closure of the canopy and lack of disturbance resulting in lack of sunlight and open places such species require. The closure of the canopy in the bushland of the part of the valley covered in this study has been traced, and is quite noticeable, in the series of aerial photographs from 1951-1982. The former openness of the sandstone vegetation is also obvious in photos of Mowbray Park

(17-19) and in comparing other old photographs[2] with the present status of the bush.

Aside from changed fire regime and changed canopy density, the other important factor influencing these changes is the increase in nutrient and soil moisture levels in bush surrounded by suburban development. This may well be a major factor in the recent closure of the canopy noted above. Clements (1980) study, of bushland between Port Jackson and Broken Bay, shows that increase in phosphorus levels in particular, due to surrounding urbanisation, is having dramatic effects.

Clements found soil phosphorous levels of 138-310ppm on shale soils and 115-134ppm on sandstone at sites tested in, or very near, the lane Cove Valley. These should be compared with levels of approx. 20-50ppm found for sandstone soils and 50-100ppm for shale soils (mainly from the Narrabeen series) unaffected by suburban development. The table below summarises the effects Clements found the changes in phosphorus levels were having on vegetation.

Effects of Surrounding Suburban Development on Vegetation Type and Abundance

Vegetation Group	Naturally Found	On Shale Soils	On Sandstone Soils
1.Mesomorphic species wet sclerophyll/r'forest	in valleys on shale	decreases	increases
2.Exotic 'weedy' sp.	only on sites influenced by urbanisation	great increase	minor increase
3.Dry sclerophyll, heaths	sandstone soils	-	decreases

On the naturally low nutrient sandstone soils increase in phosphorus is favouring the first group (if there is sufficient moisture while in the valleys and on the shale soils the exotic species are favoured over the native mesomorphic species. Thus without fire to cut back the fire sensitive wet sclerophyll and rainforest types, they are expanding into former dry sclerophyll forest while the gullies and sheltered areas, especially those with stormwater input, are being taken over by dense growth of exotics.

The denser growth of vegetation in all areas, promoted by increased nutrients and moisture also results in more rapid build-up of fuel loads for fires thus contributing to the perceived necessity for frequent prescribed burning which then damages the structure of the vegetation system.

3.2 Changes in Fauna

Evidence of both species existing in the valley at the time of white settlement, and the manner in which changes have taken place, is extremely elusive and it is difficult to pinpoint changes to particular periods. Thus this section encompasses the whole period of white settlement.

As soon as timbergetting and/or settlement began to clear large areas of land, fauna would have been affected. As settlement increased there was a progressive loss of habitat (particularly that on the shale soils), and imported animals, especially cats, would have made great inroads on the populations of smaller animals. Loss of grasses under the forests, due either to full clearing or shrubby growth, and hunting would have affected larger mammals - kangaroos and wallabies.

The changed fire regime of less frequent but hotter and wilder fires also had a severe impact. In a major fire which is reported to have swept the North Shore from Hornsby to St Leonards in 1850, the fauna was

> "...affected beyond complete recovery. Bandicoots, or kangaroo rats, were caught up in the spreading flames and burnt in thousands. Within the arc there was complete annhilation of the species...the marsupial kind was never the same again. The kangaroos and wallabies, even though they multiplied again, never ventured closer in than Gordon."
>
> (**Suburban Herald**, "Peeps into the Past", 20.9.1928)

By the time the bush and the fauna had recovered, settlement of the North Shore had progressed sufficiently to discourage their movement closer in.

However, the upper Lane Cove still supported large mammals in the 1860's. Judge Josephson, from the lower river, is reported to have frequently rowed up river, often in a party of 5 or 6 and spent several days in the forest, often taking 60 to 70 wallabies (ibid, 5.10.26).

In order to obtain some data on the extent to which suburbanisation may have affected the fauna of the Lane Cove Valley, Stephens (1978) compared the valley's bushland and species with the relatively undisturbed bushland of Ku-ring-gai Chase National Park. She concluded that the 11 species found in Ku-ring-gai Chase but not in the Lane Cove Valley could reasonably be expected to have once existed in the Lane Cove Valley as well and that their lack represented the impact of man (Appendix V).

Whilst this approach is one of the few available today, it has two major shortcomings. Firstly, it will not identify species which are now missing from both areas, for whatever reason. Secondly, Ku-ring-gai Chase National Park contains very little of the shale ridge tops and their associated soils and vegetation, thus species which once inhabited these areas fairly exclusively are unlikely to be represented.

Species present in the Lane Cove Valley and Ku-ring-gai Chase in 1978 are detailed by Stephens (Appendix V). However, the list of species represented as possibly once present in the Lane Cove Valley could be added to with further work in historical sources. The following excerpts from an article by John Plummer on the fauna of the Lane Cove River (Plummer, Vol. 48), written in the 1890's gives some further insights into the state of the fauna at that time, some of the species still present and some of the changes which had already taken place.

"In the olden days....the native fauna was considerably larger than it is at the present day. Not only were red kangaroos and wallabies plentiful, but there were multitudes of parrots of every description and perhaps a larger number of snakes than most people now-a-days would care to behold."

"Yet...the neighbourhood of the Lane Cove River is still rich in specimens of the Australian fauna....In the uncleared portions of the country...the common Opossom (Phalangiota vulpina) may occasionally be met with....Some few years ago the Native Bear (Phascolaretos conereus) might be met with in the neighbourhood of the upper water of the river, but it has since disappeared."

"Flying Squirrels (Pelaurista) are plentiful in places, as are Flying Foxes (Pterops poleocephalus), especially in the vicinity of orchards, where they create such havoc among the fruit, that they are everywhere regarded as pests and have the hand of every orchardist against them. Another unpleasant visitor is the Native Cat (Dasyuridae), as the owners of poultry, ducks and geese have good reason to know. It is something like a ferret or weasel in appearance, very ferocious, and possessed of considerable strength. The fur is of a light sandy colour with white spots. There is another variety (Dasyures viverrinus) with black fur and white spots, the most savage of its tribe."

"Bushmen regard the flesh of the bandicoot, also that of the opossum, native bear, and other vegetable-feeding animals, as delicious eating."

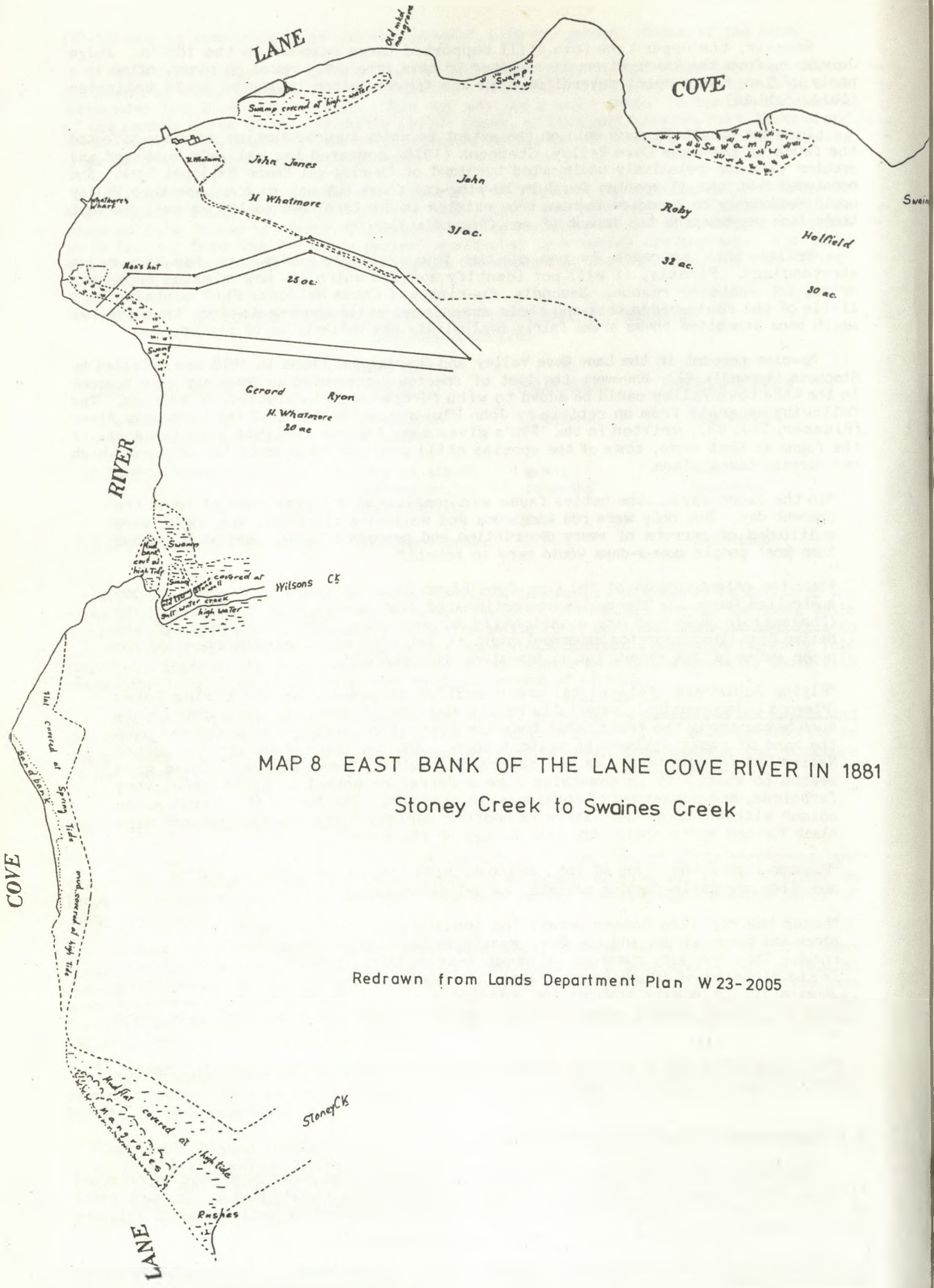
"Among the reptiles Snakes occupy the leading place. They are chiefly of the black and brown kinds, and are found mostly in heaps of brushwood and holes in the rocks. They are very numerous, although less so than formerly, more particularly in the vicinity of inhabited dwelling, the domestic cat rivalling the laughing jackass in its enmity towards the detested reptile....Lizards, many of beautiful form and colour abound; among these is the Tree Lizard, of a delicate pale green colour...."

"Of insect life there is a rare abundance, especialy of large beautiful Moths, Butterflies and Dragon Flies."

3.3 Topography/Configuration of the River

Many stretches of the river and tributary creeks in the study zone have experienced filling, natural accretion or other man-made changes in the river's banks. In many parts of the river areas of mangrove growth delineate areas of accretion while areas of fill are shown on Map 11.

The filling, generally called 'reclamation' or 'development' of low-lying mangrove swamps or grassy flats was of three types - garbage fill by municipal councils, including putrescible garbage, dredging fines, and construction fill or industrial material.



MAP 8 EAST BANK OF THE LANE COVE RIVER IN 1881

Stoney Creek to Swaines Creek

Redrawn from Lands Department Plan W 23-2005

MAP 9

Part of **PLAN**

of a Survey of

FIELD OF MARS COMMON

and grants adjacent thereto in

PARISHES OF HUNTERS HILL AND FIELD OF MARS

COUNTY OF CUMBERLAND

Scale 5 Chains to 1 inch

SHEET No 1

Notes

Names of original Grantees are written thus W. RAVEN

Names of present Owners . . . James Hicks

Names of . Occupiers . . . Brockmann

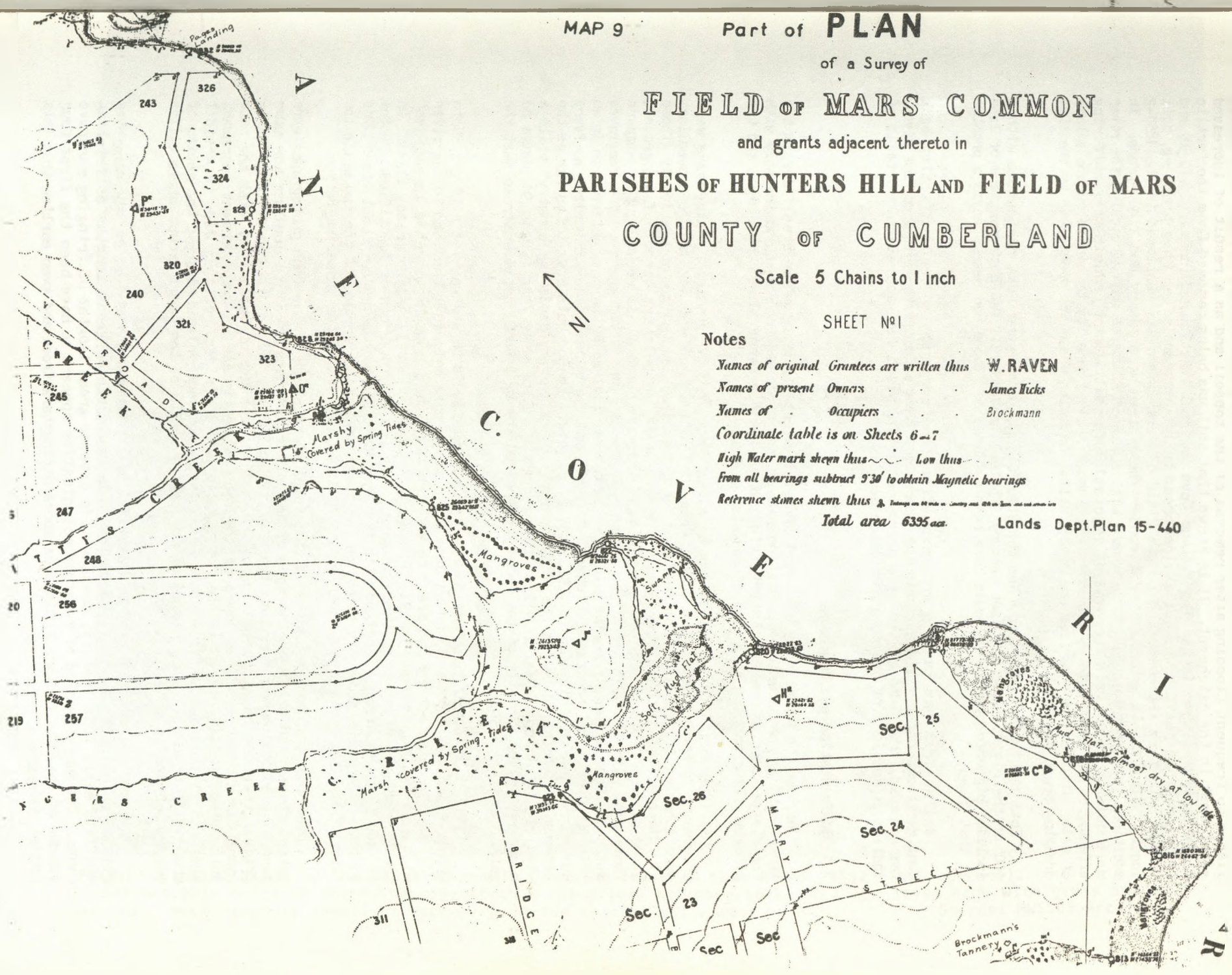
Coordinate table is on Sheets 6 & 7

High Water mark shewn thus ~~~ *Low thus* ~~~

From all bearings subtract 9°30' to obtain Magnetic bearings

Reference stones shewn thus ⊕

Total area 6395 acs. Lands Dept. Plan 15-440



Most of this 'reclamation' was carried out over the 1950's, 60's and early 70's. It is likely that the grassy flats which were filled such as the Magdala Road tip site, the Mowbray Road Athletics Field and the River Avenue area near Fullers Bridge, only became liable to frequent flooding after removal of the topsoil and as a result of increased settlement in the catchment. It is known that soil was being removed from the fertile flats along the river in the 1930's (Lane Cove National Park Trust Minutes, 26.10.38) and it is probable that it was quite widespread both before and after this time, eg. soil removal (for farm improvement) from the Field of Mars Common was mentioned in the 1861-2 Inquiry (Ch. 2). It would obviously render these areas more swampy and flood-prone. In addition, flood events became more severe with a larger volume of water reaching the river more quickly after rain (removal of vegetation for settlement reducing the buffering effect), at the same time as the river had a much reduced capacity to handle such a volume of water without overbank flow due to the siltation which was quite pronounced by the time dredging began in the late 1950's.

Both the Magdala Road site and the Athletic Field had permanent residences within 100' of the riverbank in the last century (Photo 11 and Map 7) yet both portions of land included higher ground which could have been utilised if floods had been seen as a problem at that time.

Whilst fill has had its greatest effect on topography without affecting bank configuration, other changes, including accretion, have affected the shape of the river, for example, where mangroves have permanently colonised such accretion. Details of individual sections of the river are described in Chapter 4.

3.4 Sedimentation and Mangroves

Despite the relatively low level of development along the river itself during the first century, the natural sedimentation rate of the river had increased considerably with the disturbance caused by timbergetting, clearing for farms along the ridges and the alluvial flats and the extension of unsealed roads.

By 1880 mudflats were building up along the edges of the river, mangroves were thickening in the Buffalo Creek, Stoney Creek and Kittys Creek area and mangrove seedlings were starting to appear further upstream in places they had not grown previously (Photo 6). Maps of the 1880's (Maps 8 and 9) clearly show the relative extent of mangroves, marsh and mudflats along parts of the west and east banks (it is revealing to compare these maps with the 1978 aerial photograph - Photo 1). The "vivid green of the mangroves which cluster so densely on the mudflats" just above Figtree Bridge are referred to in an 1896 description of the river (Plummer, Vol. 48) and the clusters were described as "very numerous" in 1909 (Plummer Vol. 49, p.37). However, beyond this area up as far as the watermain is referred to (in the 1896 description) as barren "sandstone country" while a view of the Chicago Starch Mills and watermain in the same year (Photo 9) shows no mangroves in the vicinity of the factory either on the west bank, nor downstream past the main.

By 1912 (Photo 7) mangroves had not grown greatly in this area, yet a 1920's photo (Photo 13) of the expanded factory shows mangroves have colonised the bend in the river adjacent to the factory and are 3 to 4m high (with an approx 2m increase in sediment width). On the west bank, in 1912 (Photo 11) grass swamps still edged grassy flats. In the long stretch of river in this photograph very few mangroves can be identified. Photos (17 and 18) taken from Fairyland with Mowbray Park in the background about the 1920's indicate casuarinas and rocky slopes on the foreshores in the earlier of the two while the later of the two shows young mangroves established in front of the casuarina fringe.

Even allowing for variations in tide level at the times the various photographs were taken, these, and other photographs of the river and maps, seem to confirm the same general picture occurring along the Figtree to Fullers Bridge stretch of the river - gradual increase in sedimentation over the first century of the colony with the rate increasing further from the 1890's as the pace of settlement in the catchment increased. This sedimentation decreased the overall depth of the river, built up wide intertidal mudflats downstream of Stringybark Creek (see next section) and plugged the mouths of creeks. Accretion also occurred along the entire length of the banks except where cliffs descend vertically into the water.

Wherever sediment built up to intertidal height and a width of 1 to 2m, the mangroves started to colonise so that, where low tide would expose great lengths of fringing mudflats early this century, now low tide exposes great lengths of fringing mangrove roots. The major period of mangrove colonisation appears to have been the first four decades of the 20th century in the area above Stringybark Creek and even earlier than this further downstream.

PHOTO 6. Installation of the First Watermain Crossing the Lane Cove River, 1892 (looking east).
Shows probably original shoreline vegetation - casuarinas and paperbarks on a low levee bank with grass swamps behind. Note mangrove seedlings appearing in the inter-tidal zone. (Source: MWS&DB Archives)

PHOTO 7. Watermain Crossing Point after Construction of the Second Pipeline, 1902 (looking east).
Trees have been removed from the eastern shore and mud accretion has widened. If the two mangroves are the same trees as in Photo 6, they have grown very slowly over the 10 years (refer to present rate of growth as in Photos 15 and 16).
(Source: MWS&DB Archives)

PHOTO 8. Watermain Crossing Point, 1984 (looking east).
Shows the same section of foreshore (ie. east bank downstream of the watermain) as in the right half of Photos 6 & 7, taken from partway across the footbridge. Mangroves have completely colonised the shoreline and have narrowed the river. From the points at which Photos 6 & 7 were taken, the river and the opposite shore are now completely obscured by regrowth bush, exotics and mangroves.

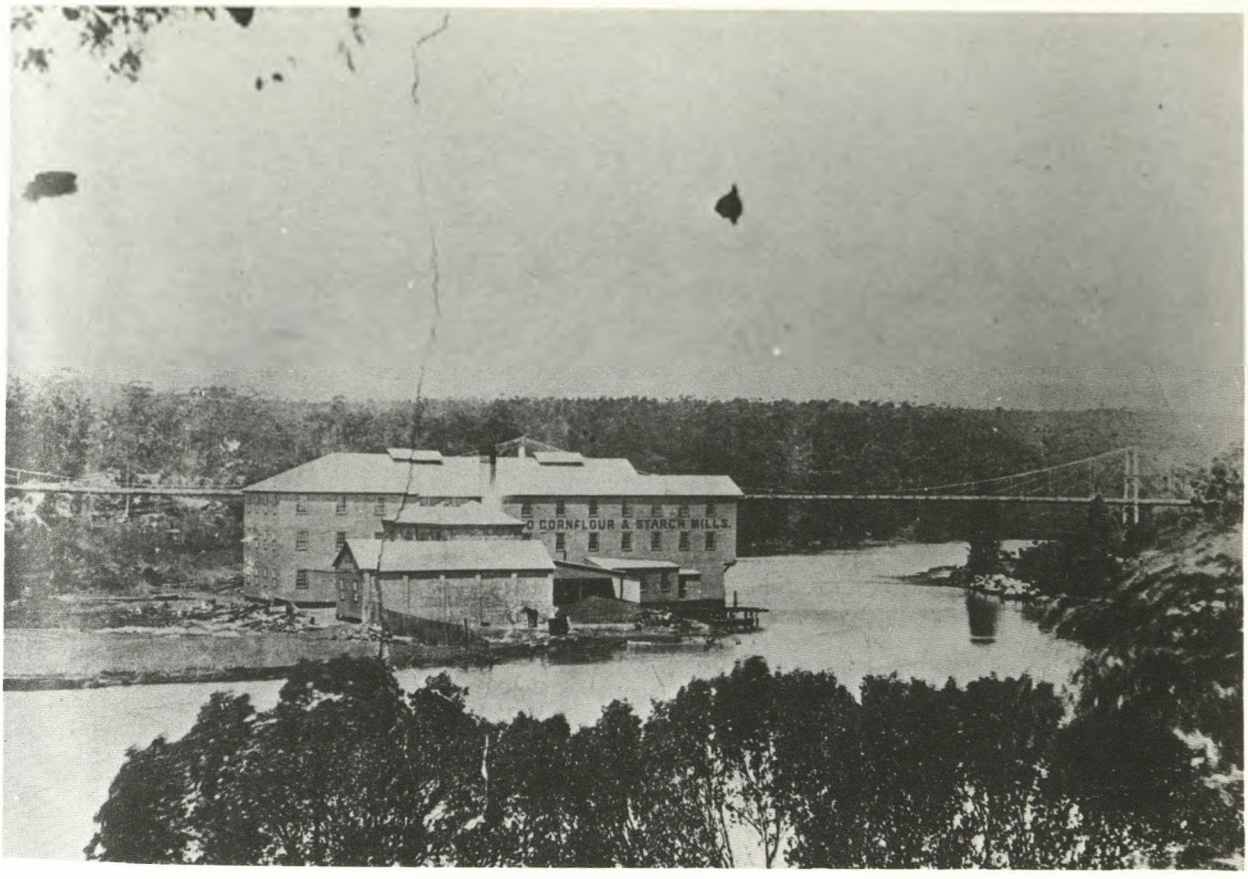
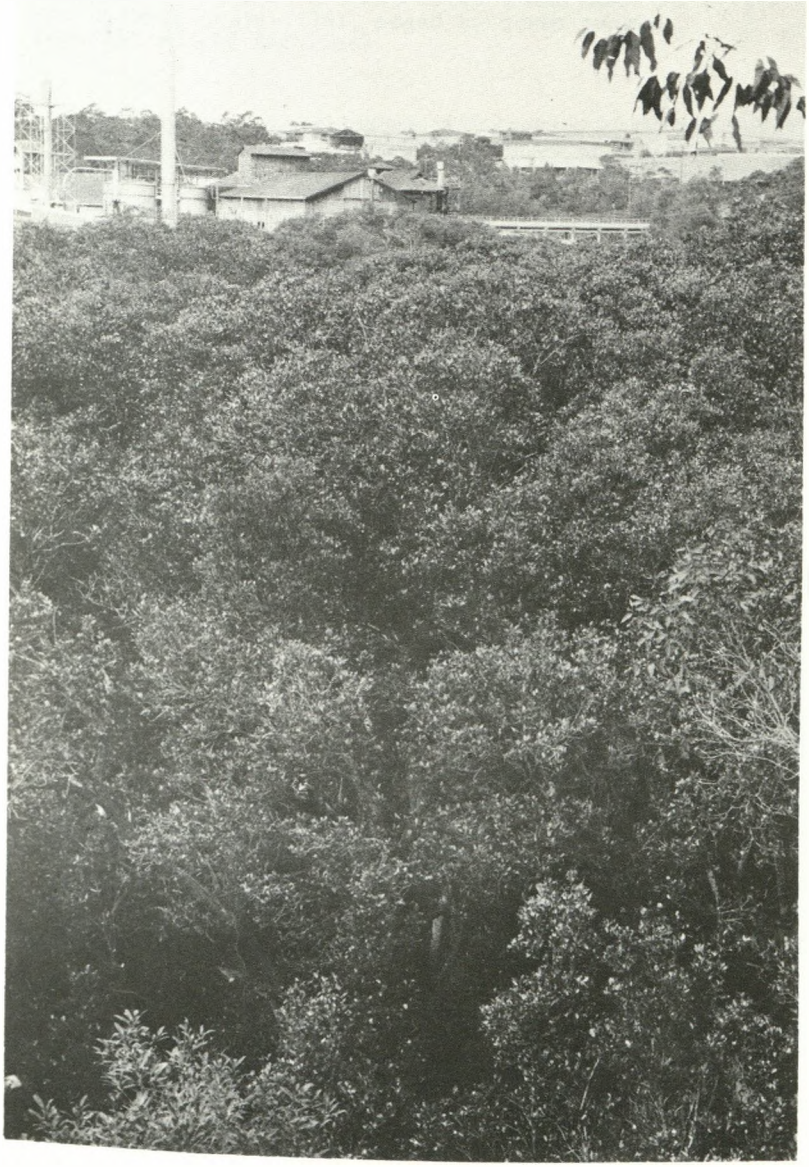


PHOTO 9. Clifford Love Cornflour Mills, 1896.
View from across the river to the north. (Photo courtesy Fielders Corn Products, Pty. Ltd.)



Notes: 1894 building still stands but later buildings obscure it from this view. First suspension watermain has now been removed but the newer footbridge and watermain in similar location is just visible. The dominant feature of this view is the extensive (in height and luxuriance) growth along the shoreline in the foreground.

PHOTO 10. Clifford Love Cornflour Mills, 1984.
Same view as Photo 9.

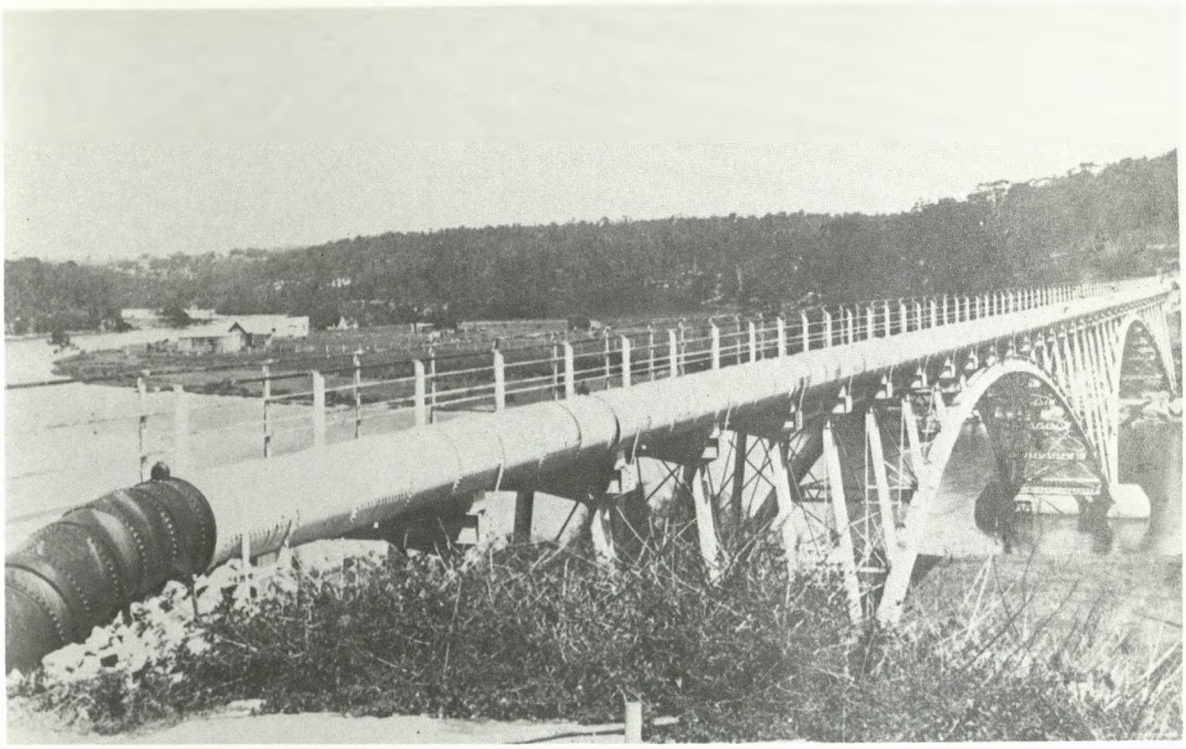


PHOTO 11. Second Watermain and Footbridge, View West to Magdala Road Tip Site and Downstream, 1912. At this time there were extensive views down the river, few mangroves and the Magdala Road tip site was a large grassy flat, edged by grass swamps.
(Source: MWS&DB Archives)

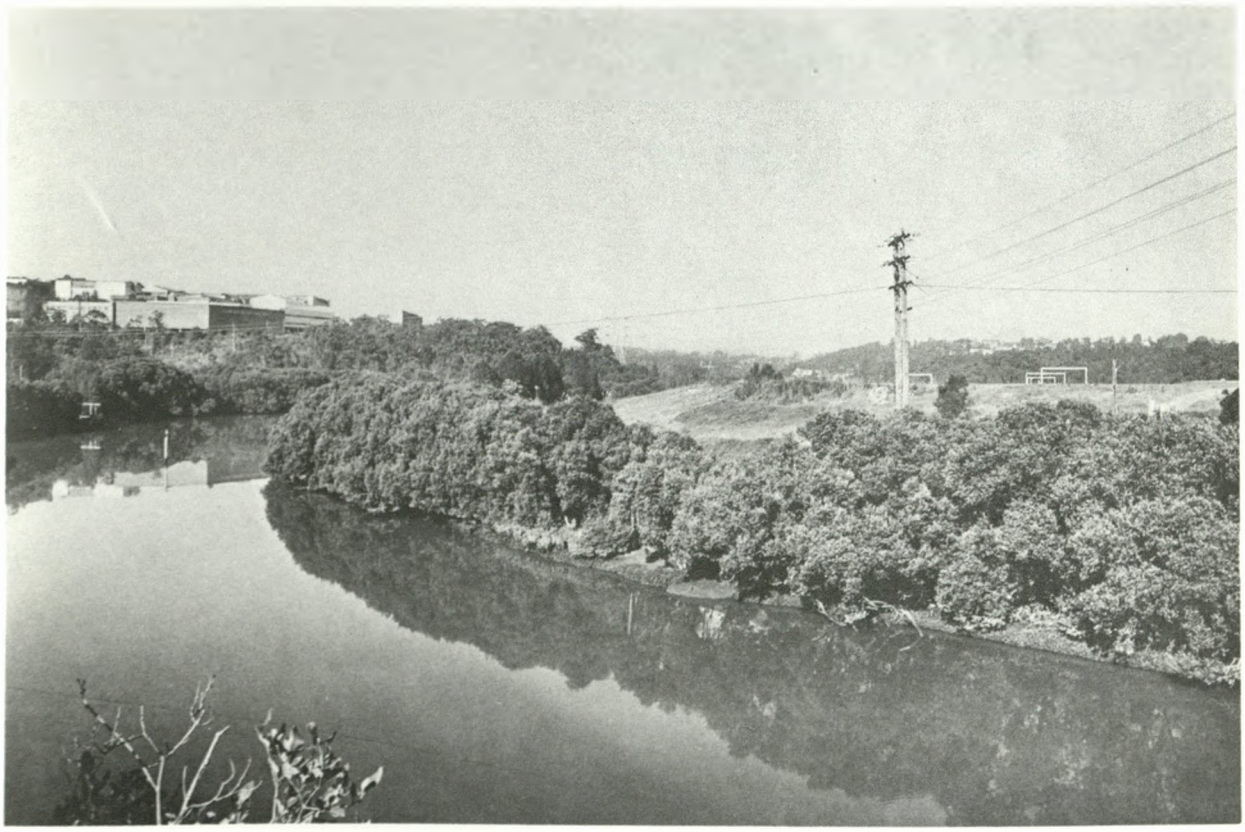


PHOTO 12. Magdala Road Tip Site, the River and West Bank Downstream of the Footbridge, 1984. The extensive views have disappeared with the height of tip fill and the lush growth of mangroves on both shores. Note also the transmission lines which pass down the valley and the skyline dominating industrial structures of the Lane Cove West Industrial Area (far left).

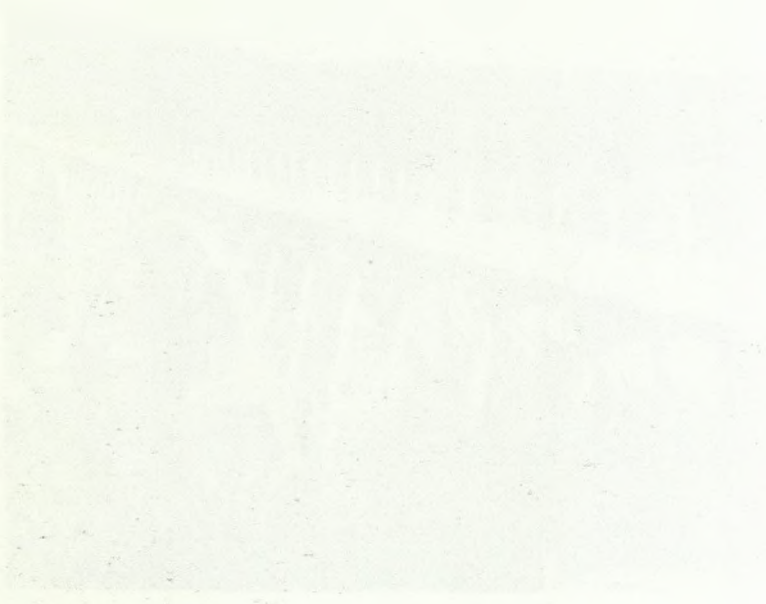


PHOTO 13. The Cornflour Mills in 1925.
Mangroves have colonised the shoreline but are not yet as tall and luxuriant as they later become. The Whatmore Estate (now the Athletics Field) can be seen in the background.
(Photo courtesy of Fielders Corn Products Pty Ltd.)

PHOTO 14. The Lane Cove West Industrial Area - View from the Opposite Shore.
1984-85 additions to the Lane Cove West Industrial Area are extremely intrusive and totally impossible to even partially screen. The opposite shore here is Sugarloaf Point, one of the best sites in the middle river for passive recreation in that it is a large, relatively flat area which protrudes out into the river and affords excellent views up and down the river.

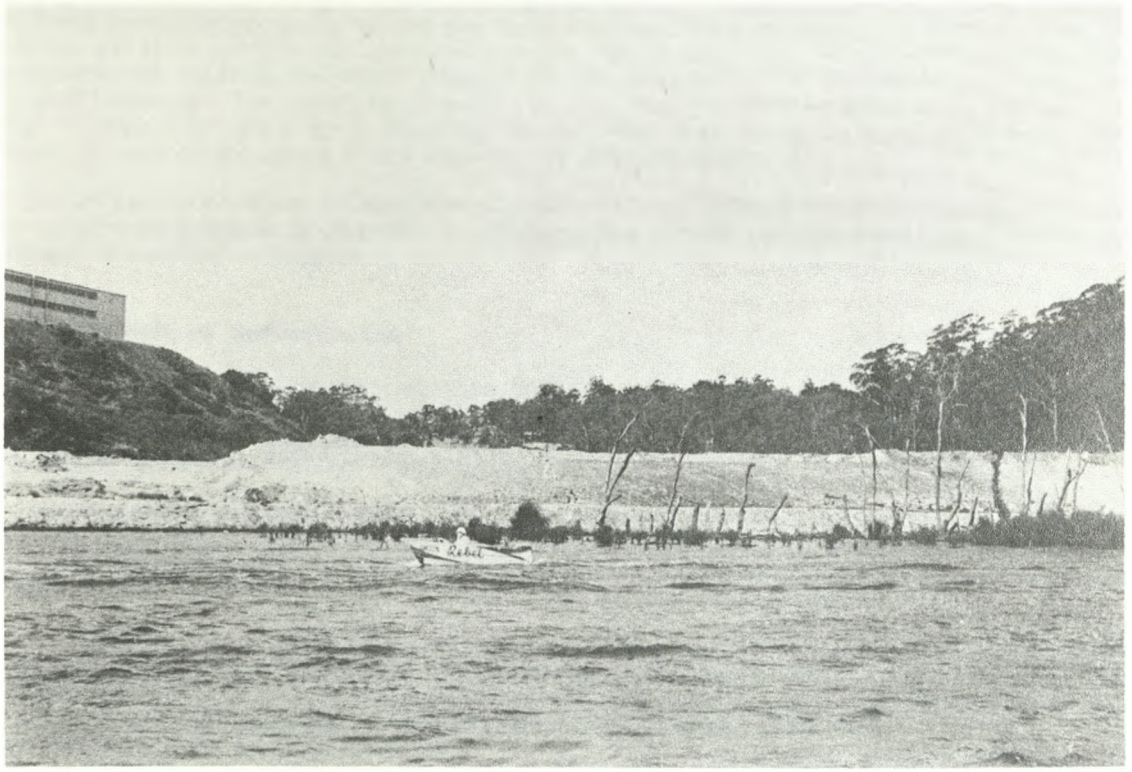


PHOTO 15. The Shoreline of Blackman Park (Lane Cove Tip), 1972.
Mangroves which filled the Stoney Creek embayment at the time the tip operations began, have been covered and those at the edge killed.

PHOTO 16. The Shoreline of Blackman Park, 1984.
Mangroves have thickly recolonised and grown to a generous height over a 12 year period.

In the 1920's the mangrove swamps were still only "in patches" (Whitham, 1927) but they have steadily grown in height and extent during this century, set back only by the dredging of this stretch of the river in the 1960's and 70's. Whenever there has been reclamation or filling, or other changes in the shoreline, the mangroves have colonised anew and thrived. The rapidity with which they are now able to grow is illustrated by photos 15 and 16 of the edge of Blackman Park. Today they are able to colonise even small patches of mud caught along rocky sections of the bank (Photo 20).

A further discussion of mangroves, their role along the river and the reasons for their increase appears in Chapter 6. Changes and growth in individual sections of the river are discussed in Chapter 4.

3.5 The Pattern of Sedimentation

Sufficient information is available to gain a detailed picture of changes in the bed of the river between Figtree and Stringybark Creek over 80 years from the 1880's to the 1960's. An analysis, completed for this study, of the rate and pattern of sedimentation, using mainly Maritime Services Board hydrographic surveys, is found in Appendix VI.

This summary analysis clearly shows the speed and extent of sedimentation of the river and the obvious difficulties this posed for navigation. As the earliest figures were taken approximately 90 years after disturbance of the catchment first began, it can be assumed that a certain amount of silting had already taken place.

In the 75 years from 1881 to 1954-56, an average of 4 feet or 1.2m of sediment was deposited on the bed of the river. This considerably extended the area of intertidal mudflats, especially between Kittys Creek and Sugarloaf on west bank, Buffalo Creek to Thorn Street on east bank and in Cunninghams Reach along the west bank. It also made the river very shallow in some stretches, for example, from Stoney Creek to Kittys Creek Became uniformly very shallow, being only 6 inches to 2 feet (0.15-0.6m) deep at low tide by the 1950's.

Such a reduction in the cross-sectional area of the river had obvious implications for its ability to flush and to cope with greater than normal flow. Insufficient tidal flushing was a contributing factor in the major pollution episodes of the 1940's (see Ch. 3.9) and in pollution caused by garbage tips in the late 1950's and early 1960's before dredging took place. The river's inability to cope with floodwaters was also an important factor in the decisions to fill many areas close to the river as they were seen as low-lying, swampy and flood-prone.

Thus the dredging of the 1960's and 70's was most necessary to rectify problems in the river's dynamics created over 170 years of settlement. Unfortunately, due to short term damage and unsightliness, and because they dared to act as a commercial operation, the dredgers were seen, and are still remembered, as the villains of the river.

3.6 Navigability of the River

The silting up of the river and consequent reduction in its navigability led to considerable agitation, led by local councils, over a long period and through various proposals for the State government to improve the situation.

In 1900 the Mayor of Lane Cove, Charles Ludowici, proposed the construction of a weir with a lock on the river at Boronia Park just above the first mangrove island (locally the narrowest part of the river)[3]. Its proponents argued it would allow navigation by passenger boats for 9 miles above Figtree, thus opening up a large area for public use and enjoyment, create shark-free bathing places, increase the value of government held waterfront land (eg. Field of Mars), by having permanent high water, and enhance the value of property in surrounding districts.

Charles Ludowici was even prepared, should the government refuse to do the work, to provide the capital and build it himself on the condition he would have the sole right to ply for hire on the upper river (the government having the power to resume at any time at cost price).

However, not everyone was in favour of the proposal. Lane Cove Progress Association wrote to the Minister for Works[4] concerned on a number of points, notably the weir's effect in changing the character of the river "which is now a stream of extraordinary beauty said to be unsurpassed in the world", the possibility of the weir increasing siltation both above and below the weir, increased liability of the land upstream to flooding and the effect on fish of the changes in salinity. The Progress Association would have preferred to see a smaller sum of money expended on dredging the upper part of the river and reclaiming and beautifying shallow spots.

The Minister for Works at the time, O'Sullivan, seemed much in favour of the proposal although opposed to a private enterprise venture and is reported to have started the project at least with the taking of borings to establish a good bottom (Plummer, Vol. 48, p.79). However, the construction was not approved by Parliament and did not proceed any further. Responsibility for such works below high water mark then passed to the Sydney Harbour Trust (forerunner of the Maritime Services Board) created in 1901. The Trust Commissioners decided that they could not finance a work they considered of no commercial value and that the sort of comprehensive scheme being pressed for the Upper Lane Cove was outside the functions of the Trust.

Agitation over the state of the river was renewed in 1907, undoubtedly anticipating the Upper Lane Cove Ferry Service which was launched in 1908, with the combined representations of the councils bordering the river to the Trust. As the new ferries encountered difficulties with rocks and sandspits, pressure continued until Parliament voted £500[5] for river works in 1909, a sum much less than the various preceding estimates of the sum required to make a suitable channel (at least 20' wide by 5' deep) from Figtree to Fiddens Wharf.

The work eventually carried out in 1909-10 involved the removal of some rocks (especially those off Stringybark Creek) and 28,775 tons of hard sand, mainly from the worst affected section between the watermain and Jenkins orchards at a cost of approx £2045, by the dredge "Pi". Much of this sand was dumped along the River Avenue flats. Davidson, whose son, William Davidson was later to dredge the river from above the weir to Figtree, started in business by winning commercial sand from this material.

Despite the dredging, by March, 1911 the Upper Lane Cove Ferry Company was drawing the attention of the Sydney Harbour Trust to the fact that considerable silting had taken place in the channel. Nothing further was done at this stage.

3.7 Recent Dredging

In the late 1920's - 30's, when the Lane Cove National Park was being planned, the silting up of the river was still a major issue. The Committee felt that below Fullers Bridge considerable dredging would be required for comfortable and speedy access as sand bars limited its use to very small craft and at low tide there were exposed large areas of mudflats which were 'unsightly not to say nauseating". In the proposed park, above Fullers Bridge, the problem of greasy mudflats, slimy rocks and lack of access to the shore, could be solved by building the weir.

Dredging was investigated in 1938-39 but the Park Trust decided to defer the dredging until the experience of the MSB with dredge leases could be seen. Dredging is not then mentioned in the minutes of the Park Trust until November, 1951 when negotiations were begun with R.C. Bradshaw Sands (Botany) Pty Ltd for dredging of sand above the weir. This commenced in 1954 when W.A. Davidson was engaged by Bradshaw for the operation. Thus, although the dredging which was being considered by the Trust in 1938-39 was of the river below the weir, when dredging began it was above the weir.

This indicates a change in the impetus for dredging. In the 1930's the move for dredging below Fullers Bridge came from the Committee and later, the Trust who still held a 'whole valley' concept of the Park with access by water. The dredging was thus important to the total scheme. Whereas in the 1950's, the desire to dredge came as much from the dredging companies looking for suitable sand. This they felt was most likely to be found above the weir (coarser sand particles being deposited more quickly than the finer silt). A number of larger companies had investigated the area below Fullers Bridge but rejected it as being most likely to be mud and silt as it was lined with mangroves.

That only 13 years after the construction of the weir and opening of the Park, the Trust was willing to have the park area disturbed by dredging operations also indicates the extent to which sedimentation was continuing to occur. In addition, the river above the weir was again dredged in the early 1970's.

Davidson, keen to run his own operation, decided to chance the river downstream and, by 1958, had formed his own company and had agreements with the Trust for use of their land, for example, in River Avenue, for stockpiling. He found good quantities of clean sand and dredged most of the study section of river from the late 50's to 1974 with the exception of the area under and just upstream of the Epping Road Bridge. This area adjacent to the Athletics Field is the shallowest section of the river today with a very narrow navigable channel. Sand Classifiers (a company formed by T.R. Powell Haulage Contractors) also dredged in the Linley Point area in the early 1960's.

The dredge plants were based at various times on River Avenue, at the present Mowbray Road Athletics Field, on the north side of the mouth of Kitty's Creek, on the accreted land of Sugarloaf and on Linley Point. The fines and charcoal were used for reclamation

at these locations and a bank of material was placed along the shore from Kittys Creek to the Magdala Road tip (see Map 11).

The locations used for bins and stockpiling were mainly Lane Cove National Park Trust land and royalties were paid to the Trust. In the mid 1960's this amounted to as much as 21% of the Trust's total yearly income ($11,404 in 1964-5) although the total and its proportion of Trust income gradually declined ($6,789 in 1968-69 - 9.5%)[6].

3.8 Ferries and River Traffic

A regular ferry service, run by the Joubert family of Hunters Hill, had been servicing the lower Lane Cove River since the late 1850's and as far as Figtree wharf (where the southern end of the present Figtree Bridge now stands) since 1884 when the first Figtree Bridge was constructed (Manny, in prep.) By 1904, there were 5 vessels on the run, making half hourly trips with a daily average of 600 people (Brady, 1904). However, above Figtree most of the water transport in the 19th century was run by individual timber contractors and landowners for their own produce, for example, the Hyndes and Jenkins families and the Chicago Cornflour Mills, or by watermen such as Joseph Fidden.

In 1908 local residents decided to open up the river above Figtree with a motor launch service to carry passengers, mail livestock and merchandise. They formed the Upper Lane Cove Ferry Co. Ltd. which ran a feeder service with two launches from a wharf near the steamferry terminus of the Balmain New Ferry Company (bought Joubert's company in 1906) at Figtree to Killara (Russell, 1970). Apart from the regular weekday service, the ferries played an important part in making the picnic and pleasure grounds, such as Fairyland, more accessible at holiday times. At these times, up to 3000 people would pass through the turnstiles at the Quay on their way to the Lane Cove River (Brady, 1904).

Charles Ludowici, who was one of the three directors of the new company, at last had his ferry service! To obtain sufficient depth of water for the service he had originated the 1900 weir proposal and had also been prominent in the agitation for dredging in 1907-1909. For this service, new wharves had to be built (shown on Map 10). The first of these, known as Ludowici's (or Walhalla) was the company wharf and dock and most of the remainder were sited on small public foreshore reserves.

Despite the 1909-10 dredging, silting of the river continued to be a problem, especially above Fairyland where launches could only proceed at high tide. In February, 1915 the regular service was reported by a Harbour Trust surveyor to be 6 trips daily to Magdala (Page's Wharf) and, subject to favourable tide, extended once or twice a fortnight to Killara when required by picnic parties (Russell, 1970). During World War I services were cut back as traffic fell off and operations ceased when the company changed hands in 1915.

After the ferry service ceased, river traffic was confined to boats associated with the two factory sites and to picnickers.

A steam tug "Doherty" towed two punts of waste paper from Sydney to the Cumberland Paper Mills on Stringybark Creek, returning with the finished products, until the factory was destroyed by fire in 1928. The site was subsequently taken over by Robert Corbett and then CSR Chemicals. A new wharf was built in the main river just below Stringybark Creek and molasses in tank barges was towed from CSR at Pyrmont to this wharf until the closing of the plant in 1967[7].

Clifford Love's flour mills, which began operation in 1894, used up to three vessels over the years to bring in raw materials and transport products. River transport was a major factor in their choice of factory site but with the advent of truck transport, good roads and further silting up of the channel, the river was no longer used for materials or products transport although a small steam tug towed a small oil fuel lighter from shell at Gore Bay for many years (Kinnimont, 1980).

In the 1920's and 30's the other traffic on the river was picnickers and holiday-makers in rowing boats, canoes and launches. Rowing boats were hired from Figtree and picnic parties could row from there to the Blue Hole just below De Burghs Bridge. Fairyland was particularly popular and crowded on weekends and public holidays. Kinnimont (1980) describes picnic launches coming from all over Sydney and Photos 17 and 18 show the lines of boats rafted up out from the shore across the river. The Swans, proprietors of Fairyland, also ran two ferry launches to meet the ferries at Figtree. After the construction of the weir for the new Lane Cove National Park in 1938 and the emerging pollution problems of the river, the popularity of the river below the weir waned with the Park providing alternative picnic and recreational opportunities.

MAP 10 WHARVES AND PICNIC GROUNDS ON THE MIDDLE LANE COVE RIVER IN 1909

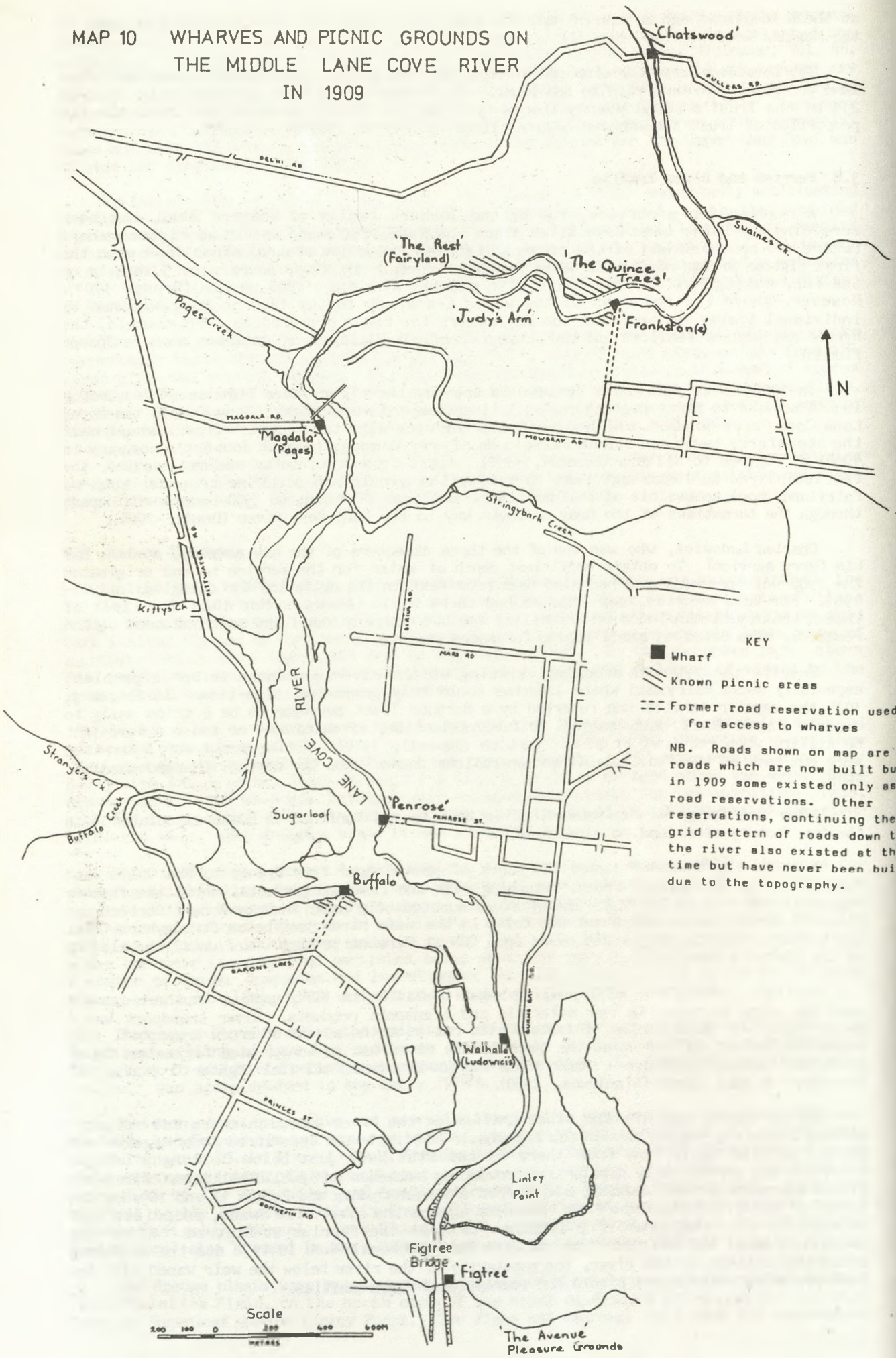


PHOTO 17.

Boats rafted up from Fairyland, Mowbray Park Shoreline in Background, 1920's and 1930's.

(Photos courtesy of Lane Cove River State Recreation Area)

PHOTO 18.

Exact dates for these two photos are not known. They are presumed to be approximately the 1920's and 30's with 17 somewhat earlier than 18. In 17, the shoreline vegetation of Mowbray Park behind the boats is casuarinas. By Photo 18, a young mangrove belt has established in front of the casuarinas.

PHOTO 19. Mowbray Park Foreshore Today.
By 1985, the mangrove belt has grown considerably in height and completely taken over the shoreline, even the rocky slopes (on the extreme right of all three photos). They almost hide the casuarinas although these, too, have grown in height and density. Note, also, that the rocky slopes and cliffs of Mowbray Park, very evident in the earlier photographs, are now totally obscured by the density of the forest growth and canopy.

PHOTO 20. Growth of Mangroves on a Rocky, Cliffed Shoreline.
Mangroves are now able to grow in very small patches of mud caught in the crevices of quite steep cliff lines.

3.9 Pollution and the Weir

Prior to the formation of the State Pollution Control Commission (SPCC) in 1971, the main government body interested in the pollution of the Lane Cove River was the Maritime Services Board (MSB), whose jurisdiction extends to the high water mark. The MSB became particularly concerned about pollution of the river in the 1940's with many complaints being received by various government departments and local councils.

Sedimentation, which decreased the cross-sectional area of the river and, thereby, its ability to flush and cope with deoxygenation, had been proceeding at an accelerated pace for 50 years. Industrial pollution was also being discharged into the river from the cornflour mills for a similar period and probably longer as it is likely there were discharges from the boiling down works which preceeded the mills.

However, it was not until after the completion of the weir in 1938 that pollution of the river became noticeable and offensive although it was episodic, rather than a permanent state of the river. During the 1940's these episodes were characterised by the river passing through a sequence of variegated and unattractive colours, fish kills and the production of noxious and nauseating odours from a gas which would persist for weeks at a time and be responsible for blackening metal and lead paintwork within a mile radius. The worst affected part of the river was the section from the factory area to the weir.

This pollution has been attributed to many sources but the major culprits responsible for creating such a state in this once beautiful river were a single factory[9], that is, the cornflour mills, and the weir. Clifford Love Mills had been discharging considerable quantities of both sulphur compounds and organic matter for a long period. In 1948 their discharge amounted to 300,000 gallons per week, typically containing 0.125 tons of sulphite and 0.5 tons total sulphur compounds (as sulphur dioxide) (Fry, 1948).

The construction of the weir in 1938 cut off approximately 2 miles of the tidal compartment, depriving the lower reaches of the scouring effects of the tidal waters which previously flowed through the weir site. It also shortened the length of river bed over which the sulphurous material from the factory could be distributed[10], reduced the current flow below the critical level required to keep the discharge from the factory area in suspension (and thereby moved downstream) and greatly reduced the freshwater component downstream of the weir under normal conditions. The weir thus "aggravated the already precarious dynamic balance in the river by introducing a new set of mechanical and biological factors and has greatly increased the potentiality of the river to pollution" (Fry, 1948). Lane Cove Progress Association's concern over the environmental effects of the weir when it was first mooted in 1900 was certainly not unfounded.

With the reduction of freshwater below the weir, the estuarine zone moved upstream with prolific growth of the salt water mussell (Modiolus confusus) and green 'seaweed' (Ulva and Enteromorpha) extending right up to the weir and into the small tributaries nearby. Spence (1947) attributed the pollution episodes to the putrefaction of this estuarine flora and fauna killed after sudden variation in salinity caused by overflows from the weir. However, the detailed study by Fry in 1948 showed that the picture was somewhat more complex.

The first episodes occurred in May and October 1939, and from 1941-1947 there were 13 pollution episodes which occurred in all seasons, with high and low salinities and after both heavy rain and dry spells. A 1948 pollution episode lasted from August to December during which the river began by turning a red-chocolate hue (like thin tomato soup) for approximately two months, then white, black and green (in that order) before clearing in January, 1949.

Fry's study of this episode, which had the same signs and consequences as previous episodes, determined that carpeting of the bottom by the decaying red micro-organism, the dinoflagellate Glenodium, disturbed the sulphur oxidation/sulphur reduction balance in the bottom muds (where large quantities of sulphur and organic material were stored)[11] resulting in dominance of the saprophytic bacteria (hydrogen sulphide producers).

The hydrogen sulphide in the water poisoned fish and other life which started to putrefy. Some of the gas was oxidised to sulphate, colouring the water white, in the upper layers where Glenodium produced excessive oxygen. The remaining H_2S escaped into the atmosphere nauseating the neighbourhood. In the mud the H_2S concentration built up pressure to such proportions that it was released with explosive violence bringing black muds to the surface. Putrefactive conditions quickly subsided with precipitation of the suspended material.

Thus, whilst the sulphurous discharge from the cornflour mills was the ultimate cause of the pollution episodes and the building of the weir sufficiently altered the conditions of the river to upset the balance of factors which had adequately coped with the discharge

over the previous 40 years, the triggering factor for the individual episodes in the 1940's was the occurrence of major visitations of the red micro-organism, Glenodium. Again, the weir seems to have been involved in these visitations as they were reported to have occurred only after the building of the weir[12].

It should also be noted that the green weed (Ulva) began dying when the red visitation began, not later with the production of the H_2S gas which affected the fish.

The discharge from the cornflour mills was connected to the sewer in the early 1950's as a direct result of Fry's report. Whilst the building of the weir resulted in such catastrophic pollution episodes in the short term, it is possible that, as a result of the study, the cornflour factory was connected to the sewer more rapidly than would otherwise have occurred. However, considerable quantities of sulphur compounds and organic materials remained in the bottom muds well after connection.

This residue was implicated in an episode of extensive mortality of eels (Anguilla reinhardtii) and sea mullet (Mugil cephalus) in the river during a drought in 1951, reported by Costin (1954). In mid April approximately 500,000 eels and 5 million mullet (total weight of 2 million pounds or 9078 tonnes had gathered near the weir, struggling for the little freshwater still coming through the spillway. The spillway dried and within 3 weeks no live fish were to be seen. Tests of the water below the weir showed a dissolved oxygen content of <0.5ppm, well below the level necessary for fish life. Siltation had greatly reduced the river's ability to flush and reoxygenate by normal tidal movement and, with low drought input of fresh water from above the weir, oxygen levels were critically depleted and not able to cope with H_2s production. Costin concluded that this lack of oxygen, due to of its utilisation in the oxidation of H_2S from the sulphur in the bottom muds, killed the fish.

Pollution in the Last 30 Years

Dredging of the river from the weir to Figtree Bridge in the 1960's-70's probably removed much of the deleterious materials as well as greatly increasing the volume of water in the river so that tidal flushing would be more effective. However, pollution continued to be a problem in the river with run-off from household sullage and overflow from septic tanks until sewerage facilities were extended through the catchment by the 1960's (see Ch.3.10).

Urban stormwater, on the whole, does not reach the sewer and its discharge carries a considerable pollutant load, especially after a prolonged dry spell has allowed build-up of deposits on streets, roofs and other paved surfaces. With the increasing urbanisation of the catchment and residential areas creeping closer to the river, the volume of stormwater and its pollutant load increased while the possible filtration zone buffering the river decreased.

Industries also continued to be a problem as Robert Corbett was taken over by CSR who expanded their operation discharging some process wastes, not rectified until 1977 (SPCC Annual Report, 1977). This factory operation has now ceased, the site sold for redevelopment and completely cleared. The new factory planned for this site is to involve packaging an imported product, rather than production, and pollution control should be relatively easy to implement.

Other important sources of pollution in the river in the last 30 years were the Magdala Road tip (Ryde Council), open from 1959 to 1972, the Buffalo Creek tip (Hunters Hill Council) from the mid 1950's to 1973 and the Lane Cove Council tip in Stoney Creek, 1954 to 1980.

In August, 1966 an MSB investigating officer found the upper reaches of the river severly polluted with dissolved oxygen levels near Magdala Road much below the minimum levels required to avoid dangerous conditions. The effect of dissolved organic matter from seepage from putrescible matter was seen as the main contributor to this state.

A little further downstream, a local Lane Cove resident in 1972 described "the black scum on the edge of water and black mud and slime on banks....not in isolated areas but stretches from Figtree Bridge all the way up to the Lane Cove National Park and it is only a matter of time before it is a 5 mile long sewer with dead foliage along the banks" (Lane Cove Bushland and Conservation Society, 1972). A far cry indeed, from the rapturous descriptions of the beauty of the river at the turn of the century.

There have also been some localised problems: one of the main tributaries, Buffalo Creek, was showing signs of significant pollution from oily effluents in the 1960's, resulting in few fish and waterbirds remaining in the Creek. Under pressure from Ryde-Hunters Hill Flora and Fauna Preservation Society, Ryde Council took action in 1970 and 1971 to have the discharges (some from the Buffalo Road industrial complex) stopped. More persistent has been the detergent laden discharges of water used for washing buses from

the Ryde Bus Depot. After a long period of negotiation, much of this water was diverted to the sewer in 1979. There is obviously still runoff from surrounding industrial, commercial and residential zones but both bird and fishlife have returned to the creek.

In the mid 1970's the SPCC conducted routine monitoring of the river at 10 sampling stations between Fullers Bridge and Figtree Bridge (SPCC, 1979). The river is now regarded by the SPCC (Annual Report, 1977) as in 'excellent' condition during dry weather conditions. However, there is significant pollution, in addition to the large silt load, during and after wet weather.

A study of storm events in 1978 (SPCC, 1980) found "large volumes of stormwater carrying high loads of pollutants (particularly oxygen demanding substances and suspended matter[13]) enter the narrow and shallow upper part of the estuary". As the river is relatively poorly flushed with stratified conditions (freshwater input over the brackish water which also gets trapped in some deep holes) persisting for some time after storms, significant oxygen depletion results.

In addition, "large volumes of sewage carrying high loads of pollutants are discharged from the NOOS although the total amounts of pollutants contained are less than those in the stormwater" (details on NOOS - the Northern Ocean Outfall Sewer - in Ch.3.10). However, this overflow also discharges into a wider and deeper section of the river and much of it is moved downstream. The remainder is dispersed over a zone about 3km either side of the overflow. At peak stormwater flow the NOOS overflow is somewhat less significant than the stormwater but it can continue discharging for a considerable period after stormwaters cease and overflows can occur in dry weather due to rain in other areas serviced by the NOOS. In this last case, when the river's volume is not increased by runoff, a considerable number of tidal cycles may be necessary to remove the overflow pollutants.

It is also significant that the 1978 storm events were studied in May and May-June, after the MWS&DB had already made most of the series of adjustments to the sewer overflow setting (between July 1977 and July 1978) which resulted in a "substantial reduction in the volume of storm sewage discharged to the river in wet weather conditions"[14].

The 1978 SPCC study (publ. 1980) pointed out that the contribution of sewer overflows to the total pollution of the estuary should not be underestimated. Yet, by showing that much of the sewage moved downstream quickly and that stormwater is a highly significant source of pollution, the report, in some measure, let the MWS&DB 'off the hook'.

The NOOS is significantly underdesigned for the population it services and is overloaded in a long section of its length. It was designed to take wet weather flow of four times its dry weather flow but it now operates at a normal flow well above its dry weather design and its total capacity "is exceeded after even light but widespread or heavy localised rain in the catchment" (SPCC, 1980).

A 1974-5 investigation by the MWS&DB advance planning group produced a plan for amplification of the NOOS with a new line further north from Dundas across the head of the catchment, which would cost $110m (1978). With priorities for funds going to new release areas, the backlog of unsewered areas (currently 6% of the city requiring approx 10 years to finish) and drainage works, it is difficult to see that sufficient funds will ever be made available, particularly as the NOOS service area is regarded as almost fully settled and therefore unlikely to increase its population and thus required sewage capacity. However, this position somewhat undermines one of the major arguments for the state government's "urban consolidation" policy ie. to make better/more efficient use of existing services.

With the attention from the SPCC that water quality in the river was receiving in the 1970's in its monitoring and controlling of tips and industrial effluent, the significance of the sewer overflows in contributing to pollution increased, forcing the MWS&DB to investigate its options. Sewage it is a distasteful and visibly unpleasant form of pollution, especially by contrast with the improving condition of the river in dry weather, which can raise considerable local protest - as it did, from the Lane Cove Bushland and Conservation Society and Lane Cove Council in the late 1970's.

In reply, the Board was able to point out the major contribution of their provision of sewerage in the river's catchment to its reduction in pollution. It could also reassure that it had done all it could about the NOOS by adjusting the overflow setting and planning amplification pending funds (shrugging its shoulders as it pointed to the 'prevailing economic climate'). If necessary they could also fall back on the argument that sewer overflows are only part of the pollution problem in the river and, under some conditions, only a minor part.

3.10 Public Construction and Services

Transport

Whilst the presence of good farm land determined the pattern of early settlement around Sydney, transport was the key to later residential development. On both these counts: availability of suitable farmland and the ease of provision of transport, the central part of the Lane Cove catchment (the gullied sandstone country) scored poorly and was 'left till last'. Residential areas really only began to eat into the edges of this section when automobile ownership became widespread.

In 1886 a railway was completed from Strathfield to Hornsby in the western part of the catchment and in 1890 a line was constructed from Hornsby to St Leonards on the eastern divide, later extended to Milsons Point in 1893. These lines linked what had been the lines of early agricultural settlement on the fertile edges of the catchment to Sydney but in 1925 it was proposed to connect the two north-south lines with an east-west link from St Leonards to Epping. Joining the Stringybark Creek valley, the route was to have crossed the Lane Cove River in the vicinity of Kittys Creek (where the river narrows), ascended Kittys Creek to North Ryde Public School and thence to Eastwood or Epping. It covered 8.25 miles and was to cost approx. £636,000 including bridge but excluding land and compensation.

This proposal received much support locally and from the Railway Commissioners with 800 - 1,000 Lane Cove citizens (out of a population of approx. 14,000 in 1926) attending a public meeting on 21st April, 1928 to support it. A measure authorising the construction was passed and a route pegged out (**Suburban Herald**, 13.1.28) but a dispute arose over the discrepancy between the pegged route and the one reported on by the Public Works Committee. Lane Cove, however, urged a start on the east side as settling the dispute and deciding whether it should connect at Eastwood or Epping could take a long time. On the 10th February, 1928 the **Suburban Herald** declared the railway was "a certainty" and expected that Parliament would soon be asked to pass the enabling bill.

However, in the middle of April, a policy of stagnation was decided on by Cabinet - no new works were to be started till those in progress were completed and no new railways to be started until the money was in hand. The general announcement by the Premier that the railway would not be built did not come until February, 1930.

This east-west rail linkage was to have been further extended by a line from St Leonards to Manly. Such east-west links would have been/are expensive due to the north-south alignment of the ridge and valley topography and, for the same reasons, would have had considerable environmental impact on the areas through which they passed, much of which in the Lane Cove Valley and Middle Harbour remain relatively undeveloped.

Nevertheless, the latterday transport problems of the northern beaches peninsula in particular, the impact on traffic congestion, and thus quality of life, of Sydney's radial transport pattern and the cost of solving these problems in the 60's, 70's and 80's are considerable. Such a cross-city connection from Manly to St Leonards and Epping, with the access thus given to the Western Suburbs, would have been far-sighted and ultimately even cheap.

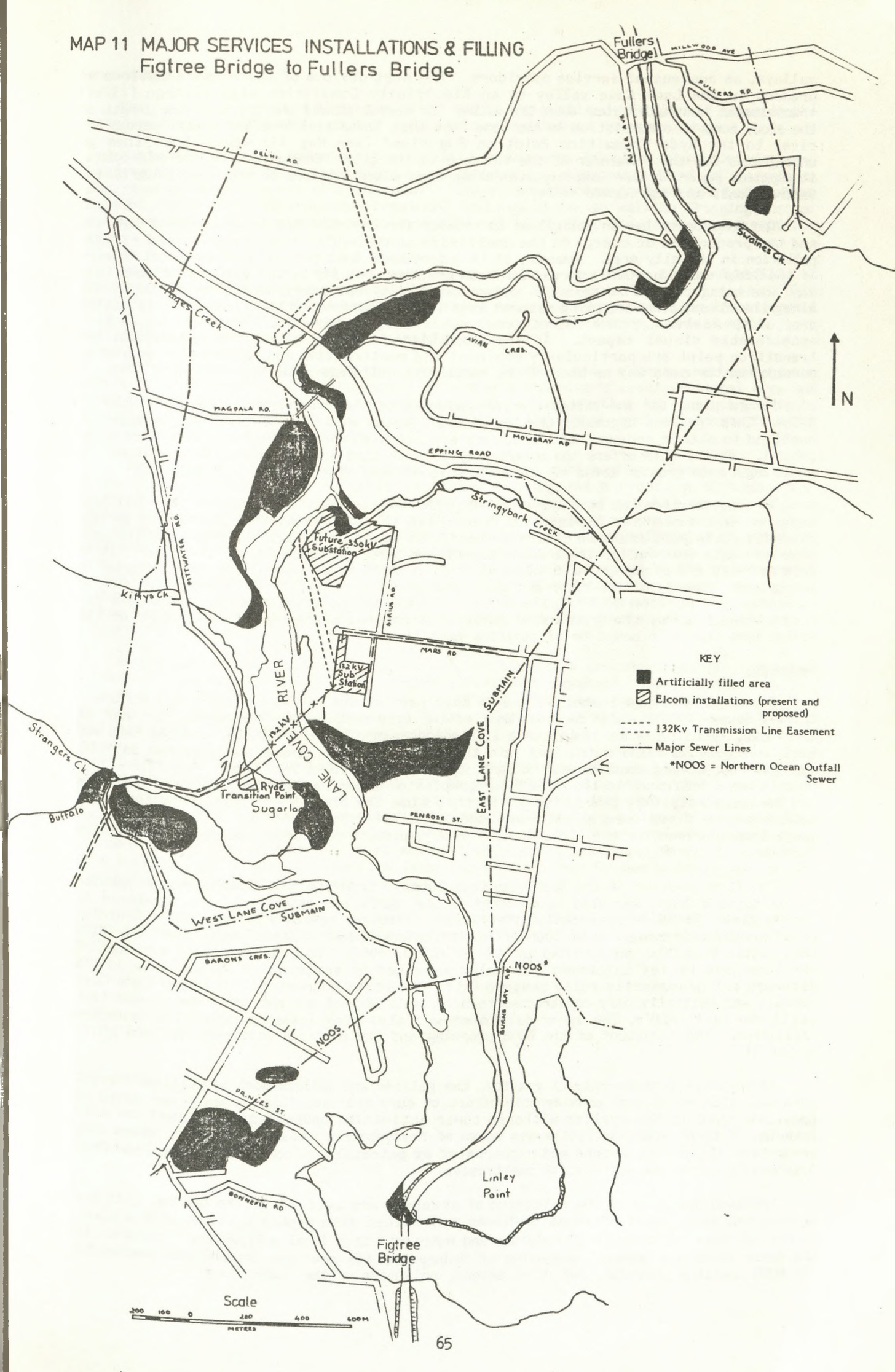
However, as Sandercock (1977) has detailed, the Country Party influence began to play a major role in the Legislative Assembly by the mid-20's with massive diversion of funds from city capital works to the country - "as Minister for Transport in 1932 Bruxner virtually stopped railway construction in the city and directed funds to country roads". Yet even in 1928 the **Suburban Herald** recognised these facts of life and commented in respect of the St Leonards-Eastwood railway, that the Minister for Public Works was a member of the Country Party and "could not be expected to be enthusiastic about the railway proposal" (20.9.28).

Instead of the railway, the Epping Road (Spooner Highway) was later constructed. A road bridge at Mowbray Road had been put forward by Lane Cove Council in 1927 as a joint project between themselves, Ryde and Willoughby Councils. After investigation, the estimated cost of £40,000, including approaches, proved too much for the Councils to proceed. Epping Road, including the bridge, was begun by the state government in 1938 and opened two years later, connecting the Eastwood-Epping area with the lower North Shore. Prior to this, such access had been via Delhi Road and Fullers Bridge, itself only completed in 1918. Prior to the construction of De Burghs Bridge in 1901, there had been no connection anywhere across the centre of the catchment between the eastern and western development except where they met at their apex at Figtree Bridge.

Electricity

Public Authorities have always regarded remnant bushland areas, especially river

MAP 11 MAJOR SERVICES INSTALLATIONS & FILLING
Figtree Bridge to Fullers Bridge



valleys, as convenient service corridors. The most obvious of their installations at present in the Lane Cove valley is an Electricity Commission high voltage (132kV) transmission link which runs down the valley for approximately one third of the length of the study zone to a substation in the Lane Cove West Industrial Area and thence across the river to the Ryde Transition Point on Sugarloaf (see Map 11) where the lines go underground for the remainder of the distance to the city. Constructed in the mid 1960's, it supplies power to inner metropolitan areas from power stations on the coalfields of the Central Coast and the Hunter Valley.

The Commission has an obligation to provide for the expanding power needs of the city and the production of energy on the coalfields considerably reduces costs and reduces pollution in the city area. However, it is unfortunate that the new environmental concern of the Commission had not emerged (or been pressed upon it) by the early 60's when this link was being planned so that the cables could be placed underground from further north. Along the river, the remaining natural area is very narrow and the river and its valley are, of themselves, prime recreational resources, so that the towers and lines have considerable visual impact. At the Sugarloaf crossover point the substation and transition point are particularly dominant and unattractive and, obviously, cannot be screened in the same way as much of the industrial buildings could be.

Future plans for the valley involve upgrading of the transmission line from 132kV to 330kV. This involves upgrading the line itself, which will involve some damage again to bushland to obtain access. If the towers are not high enough, they may even have to be rebuilt. Whilst this offers the opportunity to site them in less obtrusive positions, it would mean even greater areas of disturbance to already tiny fragments of bushland.

It also involves the building of a new 330kV substation. The site for this has been acquired at the mouth of Stringybark Creek (Map 11). At present this large site is in a degraded state yet, as prime riverside land, has great potential for revegetation as a link park site between the track down Stringybark Creek and tracks along the river. It is a large site and placement of a large substation there would have great visual impact on yet another stretch of the river and its foreshores. However, if the substation were to occupy only a portion of the site and the remainder be revegated and developed for recreational use by the Commission as part of general planning for the future of the valley (see Ch.11) it could be of positive benefit.

Sewerage

The main sewerage installations in this part of the valley are the Northern Ocean Outfall Sewer (NOOS), which services most of the city north of the Harbour as far west as Blacktown, crossing under the river a little upstream of Figtree Bridge, and the East and West Lane Cove Submains which feed into the NOOS. The NOOS scheme was prepared in 1914, approved in 1916 and constructed, in part, by the Public Works Department from 1916 - 1928 when it was transferred to the MWS&DB for completion under the Metropolitan Water Sewerage and Drainage Act, 1924 (Aird, 1961). By this time the first 5 sections, from the ocean outfall to the river were almost completed. The river is crossed by an inverted syphon ie. a tunnel driven through the sandstone with duplicate reinforced concrete pipes 4'6" in diameter.

The first section of the East Lane Cove Submain from the NOOS eastern syphon chamber to Stringybark Creek was also constructed in the 1920's and extended up the catchment to Terry's Creek in 1929-37, crossing the river's tributary creeks via aqueducts. Draining to it are submain sewers down each of the tributary creeks - Stringybark, Swaines, Blue Gum, Little Blue Gum, constructed in 1935-37 (Aird, 1961). Thus the eastern lower part of the Lane Cove Valley catchment was fully serviced by sewer mains by the late 1930's although not necessarily fully sewered (all properties connected). The West Lane Cove Submain was initially only constructed to Buffalo Creek and was not continued beyond this until the late 1960's. The upper catchment was also much later in receiving sewerage facilities. The locations of the NOOS crossing and the east and west submains are shown on Map 11.

As sewerage systems rely on gravity, the gullies and valleys must be utilised for the services. The Board took considerable effort to bury and camouflage these sewer mains as they laid them in the gullies although their activities undoubtedly hastened the weed invasion of these areas as little was known of revegetation methods. However, where such areas have since been weeded and regenerated by painstaking local effort (eg. Lane Cove Bushland Park) the sewer is quite unobtrusive.

The implications of the extension of sewerage are twofold: on the one hand, it has eliminated many local effluent problems associated with septic systems in the steep sandstone areas and seepage of moisture and nutrients into local gullies and bushland. On the other hand, the general expansion of Sydney and its sewerage demands has overloaded the NOOS creating periodic, but often severe, pollution of the lower river.

Conclusions

Many changes occurred along the river and in the bushland of adjacent areas in the second century of settlement, much of which is now not obvious as past change.

Sedimentation accelerated until at least 1.2m had been deposited along the river and mangrove growth exploded on the mudflats thus created as the nutrient level of these flats also rose with the impact of settlement. The river was then dredged and much bottom sediment removed but the mangroves remained, in large blocks as well as fringing most of the shoreline. Areas already colonised were not touched by the dredgers, except for access.

Sedimentation of the river had many other results. It reduced the navigability of the river for regular services and holiday trippers. Along with removal of topsoil from the fertile flats, it rendered these flats flood-prone and swampy and thus ideal targets for filling. As municipal garbage problems increased by mid-century, many of these flats were filled and have become active recreation areas.

Sedimentation also increased the severity of flood events, already increased by the impact of settlement in the catchment. By reducing the river's cross-sectional area and ability to flush, it also played an important role in exacerbating the polluting effects of the sulphur discharge from the cornflour mills in the 1940's and the leachate from the tips in the 1950's and early 1960's.

Vegetation of the remaining bushland also changed considerably. Species were lost, at first due to commercial and private flower picking and harvesting of timber for firewood. Assumptions regarding the 'natural' structure of vegetation communities remaining in the urban area, or the distribution of particularly commercial species, such as Christmas Bush, based on present patterns, are likely to be significantly in error for this reason alone. In addition, changes have resulted from increases in nutrients downslope of expanding suburban areas. This has caused changes in the structure of communities and promoted rapid growth, including regrowth of formerly cleared areas, thus increasing fuel loads and perceived fire hazard. Due to relative lack of disturbance in recent decades, including lack of fire, many areas have lost understorey species due to closure of the canopy.

Fauna was also significantly affected, continuing a process begun in the first century, of tremendous reduction in species variety and abundance. Very little work has been done, except for mammals and birds, to determine the remaining fauna today, nor has the available historical data been tapped to determine species which may have once existed in these areas, their distribution and habits.

To service the expanding suburbs, roads and bridges were built, a railway was proposed across the Valley but not built due to political considerations at the time and a high voltage transmission line was laid through the remaining narrow bushland of the valley. Sewer mains were laid down the river and many tributary gullies to meet the main northern sewer as it crosses under the river. Whilst the disturbance caused by the laying of the mains is now disguised in some areas (though still painfully obvious in massive weed infestations in others), overflow from the NOOS now contributes a large part of the continuing pollution of the river.

Today the river has a largely natural appearance that belies the great changes which have taken place in topography, shoreline vegetation and in the flora and fauna of the bushland.

References and Notes

1. See note 2, Ch. 1.

2. There are many such old photographs in the Small Picture File, Mitchell Library.

3. The total length of the proposed weir was 330' and the lock 20' wide, 70' long and 20' deep. Estimated cost was £7,600 and the depth of water which would thus be impounded by the weir would have been about 6' in the shallowest part of the channel.

4. Letter sent to and printed in newspaper - cutting in Plummer Vol. 48.

5. Details on the 1909-10 dredging from Sydney Harbour Trust Annual Reports, 1909-1911, Sydney Harbour Trust Letterbook A06/5071, Plummer, Vol.49.

6. Annual Reports of the Lane Cove National (River) Park Trust.

7. **Double Bond**, staff journal of CSR Chemicals Ltd, No.46, March 1979, p.20.

8. Clifford Love began by utilising the spare time capacity of the "Nellie", built by George and Tom Jenkins of Millwood farm upstream in 1881 for transport of fruit and farm produce to city markets. When business increased, Clifford Love built their own vessel, another small winch lighter, "Annie Love". In 1917-18 "Nellie" was purchased from the Jenkins and became "Nellie Love" and later came the "Peggy Love", a beamy diesel vessel.

9. At this time, the effluent discharging into the river from Robert Corbett's factory on Stringybark Creek was mainly boiler water, the main deleterious effluent going into the sewer.

10. In 1948 the impregnation of the first 12-18" of the bottom muds of the river was at its maximum near the weir where it had banked up at slack water. In addition, the highest readings of H_2S production were obtained within a quarter mile of the weir.

11. Sulphur reserve in the muds from the factory area to the weir was six times as great as the Hacking River at Audlley and three times as great as that of the Parramatta River for similar river areas.

12. Favourable conditions for propagation of Glenodium were thought to be related to salinity, the presence of an ironstone ridge in the river above Fairyland and turbulence bringing spores to the surface.

13. Including large quantities of decomposing vegetation.

14. Letter from MWS&DB to Lane Cove Council, 21.3.79.

CHAPTER 4

CASE STUDIES OF CHANGE IN SEGMENTS OF THE RIVER

The aim of this chapter is to examine the environmental history of particular segments of the study stretch of river, its foreshores and adjacent bushland, thereby illustrating the way the changes detailed in previous chapters have taken place along the river. It is by no means definitive of the whole Figtree to Fullers stretch and the detail and nature of the aspects examined vary according to the information available, although the emphasis is on their environmental history, or physical changes. The segments chosen illustrate such aspects as sedimentation and the growth of mangroves, changes in topography and shoreline, the action and role of local conservation groups and their interaction with their councils. Again, assumptions about the past will be critically examined.

4.1 Linley Point and Cunninghams Reach

Linley Point was once probably an important site of aboriginal occupation with nearby rich fishing grounds (still today it is a favourite fishing spot) due to the estuarine influence and the mudflats and other fish food sources. There were also good rock overhangs for shelter and views up and down the river. Middens and shelters with artwork have been found here, carvings on the flat rocks of the point are mentioned in some descriptions (Plummer, Vol. 48) and Larmer's 1831 map (Map 3) shows a location called "the Painted Rock" on the west side of the Point. At the head of Burns Bay, nearby, vast shell deposits were found in excavations for an early factory (Anon, 1930).

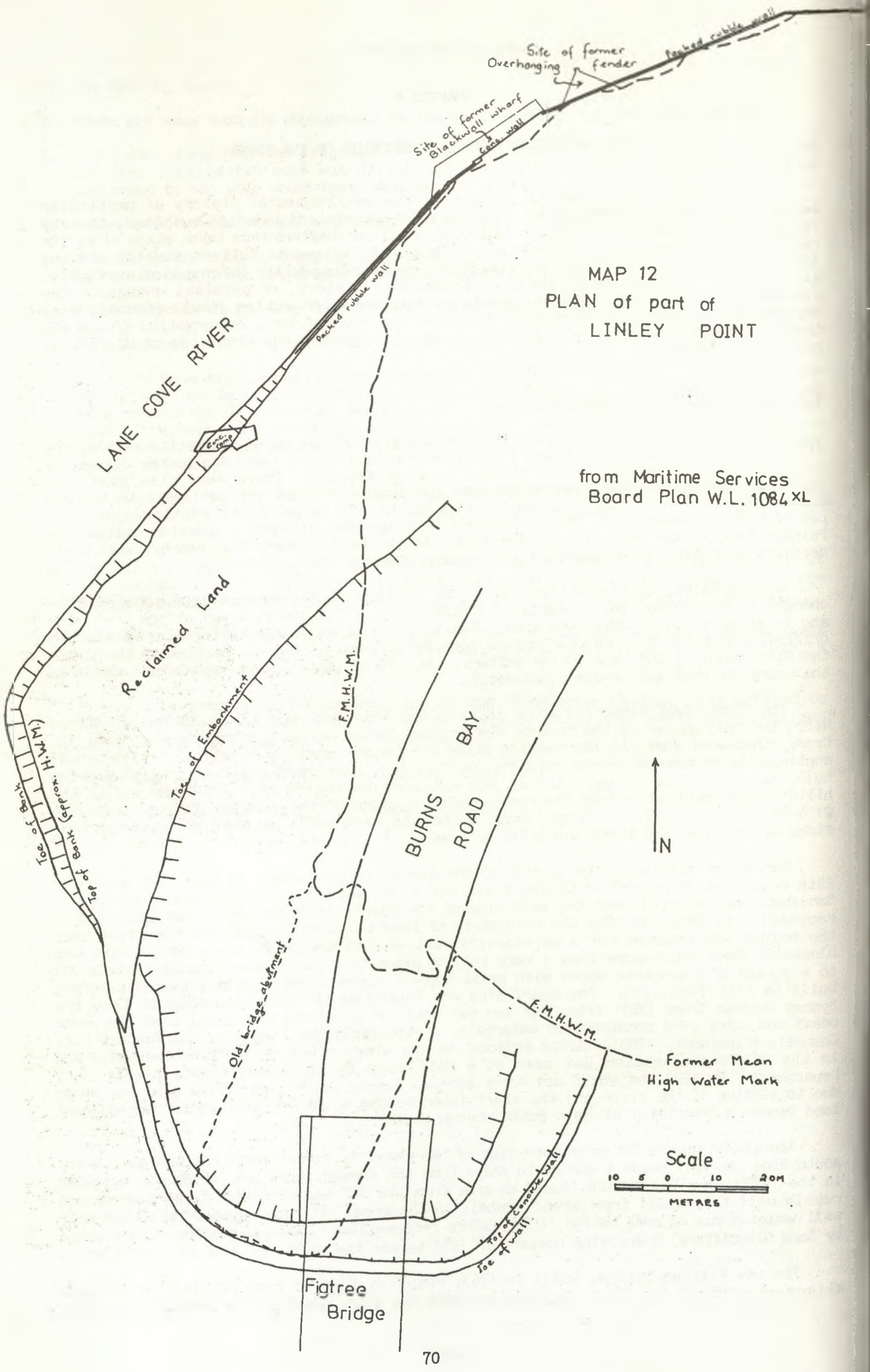
Linley Point, at the bridge and on the western side, has undergone considerable changes in topography, particularly in cutting away of the rocky slopes on the west side and in enlargement of the land area. Map 12 clearly shows the difference between the original high water mark and the present high water mark. Photos 21 to 23 also illustrate the enlargement of the land on the western side. These changes have occurred primarily in the course of road and bridge construction.

The first track along the route of Burns Bay Road was built in the 1820's by William Henry but only as far as the head of the present Burns Bay to link his farm on Blue Gum Creek (Chatswood West) to his landing place for larger boats on Burns Bay[1]. Although it continued to be used as grants extended out from the Lane Cove Road, it was only with the building of Figtree Bridge that it was extended to the Point. Some cutting of the hillside was required to take the road around the ridge of the point to the bridge (Photos 21 & 22). For this first bridge, large abutments were built out into the river on both sides of the river and these can still be seen.

During the main expansion period of the surrounding suburbs, the late 19th and early 20th centuries, this part of Linley Point was a convenient materials source and depot. Sandstone was quarried from the west side of the Point, then part of it was dedicated to recreation in 1902. In 1892 the thin strip of land between the road and the river near the bridge was resumed for a caretaker's cottage and approach to a wharf. This was Blackwall Wharf which grew from a mere landing place to a low wooden structure (photo 21) to a series of 5 concrete docks with metal hoppers above mounted on an elevated platform built in 1931 (Photo 22). The wharf area was leased by the Lane Cove Council from the Sydney Harbour Trust (SHT) from 1906 and was used for unloading blue metal from the south coast and other road construction materials, particularly for Lane Cove and Hunters Hill Councils (Kinnimont, 1980). Areas adjacent to the wharf often stored this blue metal and in the 1920's one section was used as a pole dump by the City Council Electricity Department. By 1932 the wharf and docks were no longer being used by the deep sea boats due to silting of the river and the wharf later became a public jetty while the adjacent land became a Department of Main Roads storage depot[2].

Sea walls were built on either side of the wharf to consolidate the banks. On the south side the wall began a change in shape from the former shoreline, which was extended in the 1930's when the MWS&DB leased an area from the SHT and created a large hook-shaped rubble wall from spoil from sewer tunnels in the area. It was proposed then that this wall would create an area behind it for future reclamation. This reclamation was effected by Sand Classifiers, a dredging company in 1961 to use the wharf and site as a sand depot.

The new Figtree Bridge, built in 1961, required further rock cutting for the new alignment of Burns Bay Road (depth of old and new cuts can still be identified on the



MAP 12
PLAN of part of
LINLEY POINT

from Maritime Services
Board Plan W.L. 1084 XL

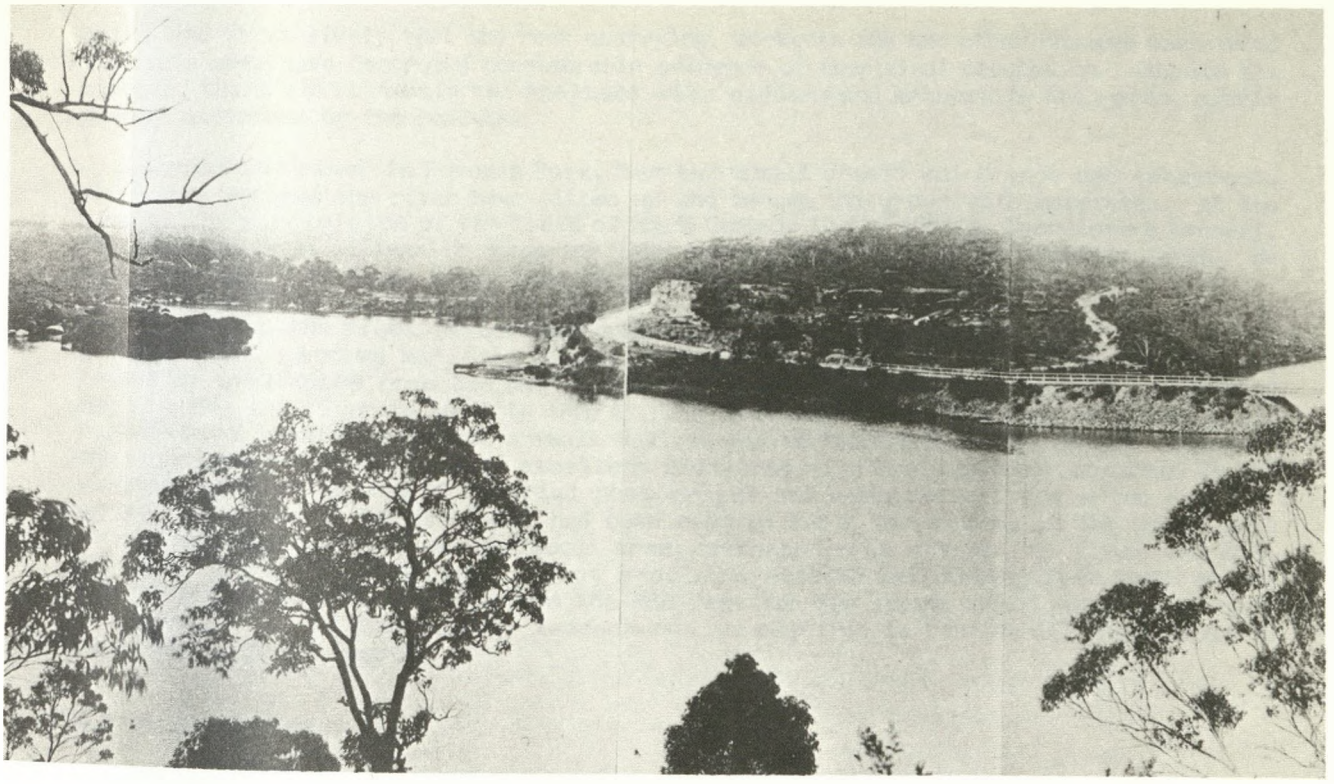


PHOTO 21. Boronia Park and Linley Point, 1890's.
(Source: Small Picture File, Mitchell Library)

PHOTO 22. Boronia Park and Linley Point, 1930's.
(Source: Small Picture File, Mitchell Library)

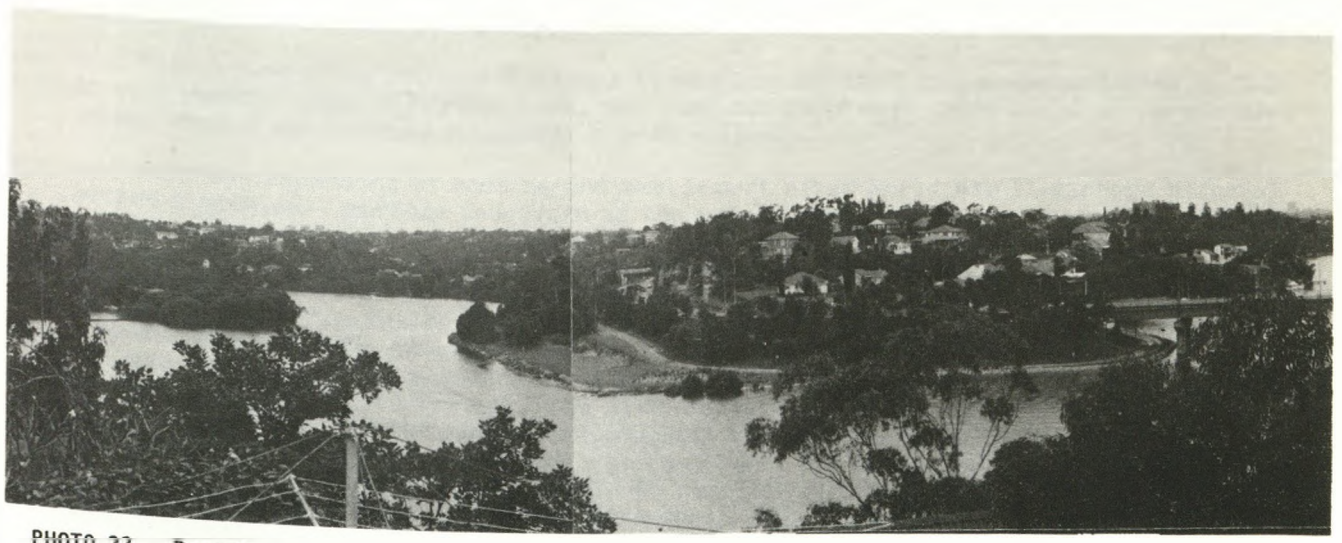


PHOTO 23. Boronia Park and Linley Point, 1980's
Mangrove island has changed very little over the period spanned by Photos 21 - 23 but the shoreline of Linley Point has been extended and land reclaimed. The abutment of the old Figtree Bridge is in the hillslope on the side of the new bridge. The concrete wall of Blackwall Wharf is the westernmost tip of the Point.

walls) and it is likely that the rock quarrying, rockcuts and the other changes associated with this area have destroyed considerable evidence of Aboriginal occupation. Despite the changes, there still remain two shelters with middens and artwork in this area, albeit greatly disturbed by the roadwork.

Across the river in Boronia Park, the two small creeks which once had embayments where they entered the river have silted up and become overgrown with mangroves. At the time of the subdivision of the Field of Mars Common in the 1880's, there was a tannery, owned by Brockman, illegally occupying land on the north side of Brickmakers Creek. He also cultivated the flats below Tipperary Falls[3].

Further up the river, at the NOOS crossing, mangroves have colonised the rubble walls adjacent to the second mangrove island. The bed area of these T-shaped walls was also leased by the MWS&DB from the SHT and the walls created from the spoil from the NOOS tunnel under the river in the late 1920's. The lease was later taken over by Hunters Hill Council for a bathing pool with a small wall at the northern end to enclose it. However, the pool merely proved to be an excellent silt trap with small patches apparent in the southern corners on the 1951 aerial photographs and complete silting up on the 1961 series. By 1970 the northern wall had been removed and a breach made in the rubble wall in the southeast corner of the 'pool' area, perhaps in an attempt to flush the silt through. The area of the 'pool' is now mudflats, exposed well above river level at low tide although the council still pays the MSB rent for the leased area[4] possibly because, under the terms of MSB leases, lessees can be required to remove all structures on termination of the lease.

4.2 Buffalo Creek

On the 1831 map (Map 3) the entry to Buffalo Creek is shown as an open embayment as far in as the gully line in the vicinity of the unmade portion of Blaxland Road, with Buffalo Creek entering the embayment in the northeast corner. The deepest part of the main river channel swung well into the embayment as part of the river's sinuosity at this point.

The 1847 Field of Mars survey (Map 5) confirms this picture with more detail. The area which has now been filled as the Buffalo Creek tip (between Pittwater Road and the Creek), as well as the mangroves to the north and east, was a lowlying depositional area of grass swamps with a few mangroves at the eastern edge. A small mudflat island with some mangroves had appeared in the centre of the bay by this time.

By 1883 (Map 9) the bay had developed extensive areas of mudflat covered at high tide and well developed mangroves on the south side and the southwest corner. Behind these mangroves, the entire area now covered by Buffalo Creek tip, and north to the creek, was still marsh. Buffalo Creek made its way through the mudflats in two channels from its earlier mouth to join the river further out. Disturbance through timber getting (to vegetation cover and in tracks and farming on the ridges and tops) would have contributed to the silt load.

Since that time mangroves have both colonised most of the remaining saltmarsh (only a small patch southeast of the tip area survives) as well as extending out onto the mudflats of the bay (see Photo 1). Even between 1972 and 1978 there has been extension of the mangrove area noticeable on aerial photographs.

This valley of Buffalo and Strangers Creeks has had two local councils trying to fill it with garbage since mid-century and, had they had their way, there would be very little of the natural environment remaining in this valley.[5].

With the expansion of housing and settlement after World War II garbage disposal became a problem - garbage increased as the possible disposal sites decreased. In the 1950's there was small scale dumping on the east bank of Buffalo Creek adjacent to Pittwater Road. Early in 1966 Ryde Council proposed piping Buffalo Creek and filling a large section of the Field of Mars Reserve to a depth of 50' (15m) over a period of 16 years. An Anti-Tip Action Committee (ATAC) of local residents formed to fight the proposal mainly on the grounds of loss of amenity through vermin, flies, tip fire smoke and unsightly views. A secondary argument was "loss of the last remaining natural asset of the Ryde District". However, the Ryde-Hunters Hill Flora and Fauna Preservation Society also formed at the same time (inaugural meeting 16.2.66) to fight the tip proposal for protection of the natural area. The Committee and the Society concentrated their opposition on finding an alternative site or means of garbage disposal. Once accomplished and approved by the Health Department in August, 1966, the Council dropped the Field of Mars proposal.

The Flora and Fauna Society's first aim was to make the Reserve secure. In February 1966 they resolved to have trusteeship of the Reserve transferred to the Lane Cove

National Park Trust so that the Trust could have this area developed as a sanctuary with the Society's assistance. These negotiations did not succeed and, when the tip proposal was dropped, a co-operative management was agreed upon between the Council and the Society. Through council, application was made to the Department of Lands to have the area declared a Nature Reserve but this was unacceptable as such reserves are used exclusively for scientific reference areas. However, under the Crown Lands Consolidation Act, the reserve could be declared a Reserve for Flora Preservation with former tip areas converted to picnic areas, bushland open space and maintenance to sustain a state of naturalness. The Society decided to investigate the option of setting up a Trust under the Act with representatives from Council and the Society[6].

It was decided that the society did not have the financial and technical resources to become Trustees nor could they guarantee future membership of the Society to carry on the work. Thus the reserve stayed under Ryde Council's control but the Society was authorised to manage it. No direct grants are made to the Society for this purpose but council resources, such as for mowing, are used and Council has provided improvements such as a water supply and the Field Study Centre Building.

However, the Society was still motivated by a strong desire to make tenure of the Reserve more secure to protect it from gradual whittling away for addition to the cemetery as had happened in 1920, 1924, 1926 and 1967 (total 15 acres)[7] or other purposes. They finally succeeded in having the Lands Department regazette the land as a reserve for "Public Recreation and the Promotion of the Study and Preservation of Native Flora and Fauna" under care, control and management of Ryde Council in 1974. In the same year it was declared a "Wildlife Refuge" under the National Parks and Wildlife Act, 1974.

As part of this drive to secure tenure and to provide solid reasons for expansion of the reserve area, the Society has oriented its activities to the promotion of the reserve as a centre for environmental field studies. Extensive negotiations have taken place with the council and the Department of Education over expanding facilities for this purpose eg. provision of a classroom, teacher, a ranger, road access and a bus turning circle. The Education Department was enthusiastic about the area and willing to provide a classroom and teacher while the Council felt it should not have to pay for the road and turning circle. The three-way negotiations began in 1974. By 1977 it was agreed that the Department should purchase the unmade portion of Westminster Road which projected into the reserve, for the building of a classroom for a sum which could be paid to Council to provide for the road and turning circle. Council has now been paid approx $11,000 and the land set aside but the project remains in limbo awaiting further funding.

Hunters Hill's contribution to the filling of the Buffalo Creek valley was the Hunters Hill tip, north and east of Pittwater Road, operated from the mid-1950's to 1973 on an area of 7 acres. It was then used as a transfer station until 1975 when it was closed due to resident action and the refusal of the Minister to allow a permanent transfer station.

In 1954, at the time the tip was proposed, negotiations were begun with the Maritime Services Board (MSB) to enlarge the tip area by 'reclaiming' mangroves to the west. No formal agreement was reached and the application was withdrawn in 1961. In 1965 the Council reapplied for the area but decided not to proceed in 1966,[8] possibly due to the agitation over the nearby proposed Field of Mars tip.

4.3 Sugarloaf to Kittys Creek

Sugarloaf appears to have been a rocky headland and cliff with a reef or long low rocky island projecting out towards the opposite bank, narrowing the river and creating a quiet depositional area behind. Larmer's surveyor's notebook and the 1831 map show this area on the river side of the Sugarloaf cliffs as flat land attached to the headland. However, the 1847 map clearly shows the boomerang shaped island offshore which has appeared on maps ever since with grass or mangrove swamp in the triangle between the island and the Sugarloaf cliffs.

Exactly what this feature was and how it has changed, is hard to decipher. The area is now totally tied to the main area of Sugarloaf as the dredge plant operated here in the 1960's and 70's. The level of the island was raised and some of the mangroves behind the island at this time were cleared and filled with the dredge material which was also piled up against the cliff line. However, the flat rock ledge projecting from the northeast corner ie. the northern end of the former 'island' can still be seen. Examination of the area shows a narrow gap between the cliff of Sugarloaf and the rock ledge, which is now filled with dredge material. Three pieces of historical description of the river also provide some clues.

In a guide to a trip up the river of 1882 Gibbs, Shallard and Co. instruct one to leave Figtree wharf heading for the quarry on Linley Point. then hug the right bank for a

quarter of a mile:

> "On your left is a mangrove island; give it a wide berth till you reach a reef in front of the mangroves (left side), Buffalo Point;"

The 1882 map clearly shows mangroves behind the island.

In descriptions of trips up the river in 1909-10 (Plummer, Vol. 49), the reef is not mentioned but:

> "...when off what is known as Buffalo Creek attention is directed to the remains of two rather large craft which have found their last resting-place on the mud bordering the foreshore The remaining ribs of the one show it to have been a wooden vessel, while the few iron plates of the other indicate that she was of more modern construction. Those are the remains of what were years ago two boats engaged in the timber trade for which the river was famous."
>
> p.37

and:

> "Winding away, with the Field of Mars on the left, Buffalo Wharf is next passed....Still winding away, Penrose Wharf is reached on the right, and we now enter a straight reach for about a mile. In passing, are to be observed the "bones" of the local craft which navigated this stream 40 or 50 years ago, before the advent of road formation or cultivation to any extent. These remains have done much to stiffle the stream by reason of the immense amount of wash by the tide."
>
> p.41

The location of these wharves is shown on map 10. The descriptions would indicate that the island or reef was probably the location of these boats which may have foundered on a submerged part of the rock ledge or may have been tied up behind it as a final resting place. The flat rock ledge adjacent to deep water would have made a convenient place to load the timber taken from this part of the Common. Boats which were moored next to the ledge or foundered and broke up would have aided the trapping and consolidation of silt around the ledge or reef, allowing it to become vegetated.

Across the river, the entrance to Stoney Creek was a funnel shaped embayment with rushes on the edge. By 1881, it had become a mudflat covered at high tide with a mangrove island in front of the entrance (see Map 8). At this time these mangroves were shown as the only mangroves between Stoney Creek and Swaines Creek on the east bank and there were wide lowlying flats edged by a sandbank upstream from Stoney Creek. By 1951 the Stoney Creek embayment was almost entirely filled with mangroves. In the 1960's and 70's it was filled by Lane Cove Council as a municipal garbage dump to its present level before conversion to active recreation areas.

Apart from extension by mudflats, then colonisation by mangroves and some disturbance on the north side by dredge plant operations, the Kittys Creek area has remained relatively unchanged. The flat area of the mouth has extended further into the river in the fashion of a delta. These extensions can be seen starting as mudflats on the 1883 map (Map 9). At this time the south side of the mouth was still a large area of marsh. This has subsequently been largely colonised by mangroves. As in Buffalo Creek, only a very small section behind the mangroves survives. As this area has not been disturbed by filling the process of colonisation is easily seen.

Accelerated deposition between Sugarloaf and Kittys Creek had begun by 1847 with development of swampy areas. By 1883, mangroves were very evident on the north side of Sugarloaf with further wide mudflats stretching into the river. The mangroves thickened and extended onto the mudflats as the silt continued to accumulate. In the late 1960's, when dredging took place there was a small outlier section colonising out from the smooth sweep of mangroves from Kittys Creek to Sugarloaf and this was not dredged. The dredging of the accumulating deposition along this stretch has stopped the forward march of the mangroves for the present, except for the outlier which now projects from the shoreline into the river, narrowing it at this point. One of the five sandy beaches along the study stretch of the river is on the south side of the outlier.

4.4 Magdala Road Tip Site

The tip site was one of the largest grassy depositional flats along the river. The 1847 map indicates scattered mangroves only at the southern end of the flat while photo 11 shows the area in 1912 edged by marsh and a low levee. The flat was highest at the northern end and lowest at the southern where it merged into swamp.

MAP 13 SKETCH PLAN

showing garbage disposal area
near Magdala Road
NORTH RYDE

Source: Files of the Lane Cove River State Recreation Area.

The area was part of the Field of Mars Common until the subdivision of 1884 although it was occupied prior to this as the encroachment of the 1847 map shows. From 1884 to 1949 it was probably farmed or grazed but it was then purchased by the Crown along with several adjacent lots (242, 244 & 320) for addition to the Lane Cove National Park[9] from the estate of Lyle Brisbane Swan (related to the Swan family who owned and ran Fairyland, a short distance upstream). The two cottages on the land continued to be occupied until late 1957 when they were vacated and demolished.

At this time the land was drained by a system of channels (Map 13) and had a clay bank in front of portion 326. By this time flooding of the lowlying land along the river had become a severe problem due to the silting of the river and the drainage channels would have removed excess water away to the swamps in the south and back to the river.

On the 6th January 1959 Ryde Council applied to the Lane Cove National Park Trust to establish a tip on this land (excluding the swamp area to the south). This proposal was for fill to three or four feet[10]. The Trust had no objections if the MSB and Health Department approved and necessary conditions were imposed although they did suggest the adjoining Council lands be transferred to the Trust.

And so began one of the most disastrous and irreversible changes along the entire length of the river whereby the Trust, over the years, appeared to bend over backwards to accommodate the requests of Ryde Council, receiving at the end of it only the worst end of a hard-driven bargain over this land.

Not long after tipping operations began, Ryde Council began a series of requests to increase the height of the fill as an "interim measure" while other long range tipping sites were investigated and organised. By November, 1964 the request was for another 10' on 9' (3m on 2.7m) of fill over most of the area and 7' (2.1m) at the northern end. The Trust continued to accommodate the Council's requests, including agreeing, in 1965, to extension of the tip to the south, as they wanted to "help Council" with its gargage problems.

The Trust's main request, in return, was for the closure of the unmade Pages Road and transfer to the Trust along with lots 9 & 10 Pages Road so that, the whole area east of the proposed expressway could be planned and developed as a single unit. Council agreed to the closure of Pages Road in February, 1968 along with a request for further lifts in the tip height of 8' (2.5m) and 3' (0.9m) which became, after the Trust agreed, 10' (3m) and 5' (1.5m) in July, 1968 (the original plans for the tip involved two levels - the riverside or eastern half at the lower level and the western half at the higher level). The Trust again agreed in August but imposed the condition of payments to compensate for the loss of revenue from the caravan park which the Trust was planning to establish on the tip site after completion. It had established earlier in 1968 with the Department of Public Health that the site was suitable for a caravan park provided the caravan sites were on the higher level. In 1971 the Department of Lands advised that the proposal had not been approved. Further representations were made via the Local Member, Laurie McGinty but it was refused again early in 1972 without any formal expression of reasons.

Thus over the years the tip grew in height and the top level grew wider and closer to the river so that, on completion the lower level was only of road width. It is now 10-13 metres above the river - a large open space quite separated from its place as part of the valley (Photo 12).

In late 1973 an impasse had been reached over land which the Trust wanted to obtain from Ryde Council at the De Burghs Bridge entrance to the park (Portion 505 plus some adjacent roads - all land under Council's control bounded by Ryde Road, Fontenoy Road to Pittwater Road). Council maintained it did not want to close these roads as it wanted to establish playing fields there. The 'compromise' was to swap the Magdala tip site (Portion 324-6) for the land the Trust wanted. The Trust reluctantly accepted this compromise although believing the swap was "not as equitable as it might have been". The Lands Department gave its approval in April, 1976.

Thus the Park lost an important segment of the river foreshores downstream of Fullers Bridge, first by the approval of garbage disposal on the site to such a height that the land was alienated from the river and, to a large extent from its place as part of a valley and thus not able to be used for riverside picnic areas. And secondly, by being forced to swap their former potential picnic areas, which Ryde Council now had a good case for arguing was most suitable for active recreation, for some non-riverside land, needed mainly to tidy the park boundaries and entrance.

A plan for the area for active recreation was agreed on in 1974 and the land was swapped in 1976-77 but development was only begun in January, 1984.

The tip itself was also an important source of pollution of the river. In 1959 the MSB was not happy with the proposals for construction of the tip with only a clay bank on

the river's edge. Their normal requirements stipulated a stone faced seawall to prevent erosion and sealed to prevent seepage. If the Board had had "full authority" such a stone wall or facing would have been a condition of approval.[11]. They were also concerned about the flood levels of the river and seepage through the internal drains and thus advised various conditions should be imposed regarding the height of t he clay bank and sealing of the internal drains to prevent stormwater entry and seepage[12].

Thus, when Ryde Council applied for an extension of the tip area into the more swampy area to the south[13] (by now thick with mangroves) early in the 1960's, there was considerable correspondence, investigation and negotiations over a number of years. Ryde Council claimed it wanted to create a continuous chain of parks along the river, converting the mangroves to active recreation areas. (In the early 1960's Ryde lacked sufficient garbage disposal capacity and was, almost desperately, exploring ev ery avenue.) However, the MSB felt it had been "caught" on the main Magdala Road tip in not being able to insist on a proper sea wall. The mangrove area to the south fell more within the Board's jurisdiction as unreserved Crown swamp and the building of a substantial wall was the first condition of approval, along with drains, ballast walls and responsibility for silting caused by the tip, given to Council in January, 1966. The Council saw these conditions meant considerable expenditure and negotiations continued. Further investigation by the Board found the upper reaches of the river severely polluted with very low saturated oxygen levels near Magdala Road as a result of seepage from the putrescible garbage. More filling would exacerbate the problem by reducing water area and tidal flow.

Thus the Board withdrew its approval for putrescible garbage in the southern extension but the previous approval for non-putrescible garbage remained. Ryde Council then withdrew its application as the establishment costs would not be worthwhile for only non-putrescible garbage. This area still remains unreserved Crown 'land' with dense mangrove growth.

4.5 The Whatmore Estate

Across the river and just upstream from the Magdala Road site was another depositional flat with areas of swamp at the edges, which came to be known as the Whatmore Estate and where there is now the Corn Products/ Fielders factory and the Athletic Field. Prior to its grant to John Jones and J.R. Hatfield in 1833, it was occupied by Aaron Pierce and there were two huts on it (Map 4). Pierce was a timber contractor, employing 6 men at the time of the 1828 census (Earnshaw, n.d.). He did apply to purchase the land but was unsuccessful in bidding for it[14] and subsequently moved to the Wahroonga area.

Map 8 shows the area in 1881. At this time the flat was unoccupied and edged by a number of grassy swamps with casuarinas and melaleucas on the levees on the edge of the river (Photo 6). By the 1883 Survey of the Field of Mars Common "Berry's Bone Mill" had been built (Map 9) and an 1886 map (Map 7) shows Whatmore's boiling down works and drying racks. The boiling down works may not have been a great success (or served only a temporary need) as this part of the land owned by the Whatmores was sold to Clifford Love in the late 1880's. The industrial history of the site from the 1890's is detailed in Chapter 9.7. Part of the rest of the Whatmore Estate was resumed for road and bridge works in the late 1930's and the rest was purchased for open space by the Cumberland County Council and handed over to Willoughby Council in the 1950's.

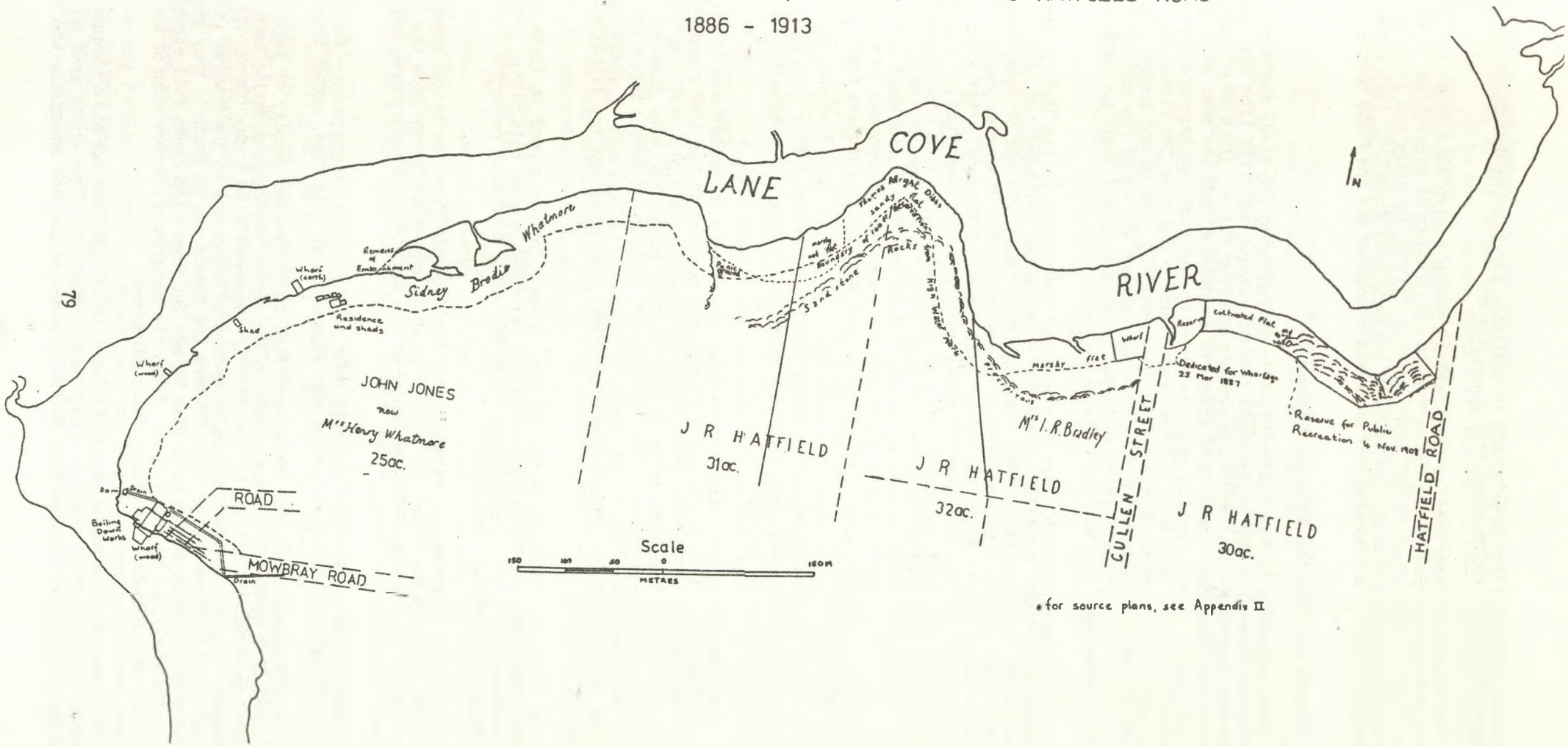
Apart from the edging swamps and inlets, there is no indication on any maps of last century that any of this land was particularly low-lying or prone to flood and a number of buildings were sited within 30m of the river. To establish the boiling down works drains were put through the swamp areas while the later building and expansion of the cornflour mills on the same spot would have required fill to consolidate these swamp areas. Fill may also have been required to raise the level of parts of the site generally as the flood problem worsened in the first half of the 20th century. Photos 9 and 13 show the factory and its site in 1894 and the 1920's and Photo 7 shows another part of the site after 1912 with the waterside trees removed and reinforcement of the levees.

The land to the east of the factory, in the 1920's sloped back from the river and was fairly open and grassy and fringed by mangroves but, by the late 1930's, it was being affected by soil removal, possibly as there was disturbance in the area with the road-building. This, along with the greater tendency of the river to flood (see Ch. 3.3), made the land more flood-prone. Thus, when this part of the river was dredged in 1960-61, an opening was made in the fringing mangroves and wastes from the dredging used for filling.

When the dredging operation ceased here in mid-1961 and Willoughby Council considered its development for active recreation they found considerable filling was still required and were happy to accept the proposal of the Rotary Club of Chatswood to develop the area as an Athletics Field (no such field then existed on the North Shore) despite the misgivings of the Chatswood West Progress Association who had "always been of the opinion

MAP 14 COMPOSITE PLAN OF THE 100' RESERVATION, MOWBRAY ROAD TO HATFIELD ROAD

1886 - 1913



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* for source plans, see Appendix II

that some portion of the area should be available for passive recreation for the benefit of the residents of the Municipality generally".[15]

The land was described as then "mainly swamp rising to a rocky hillside on the southern boundary" and as requiring "15,000 cubic yards of excavation, mainly rock, to reduce the hill and about 50,000 cubic yards of filling to raise the level of the ground to a safe height above high tide level of the Lane Cove River"[16]. This work, with a lot of voluntary labour and donated equipment was completed and the Field opened in 1967.

4.6 Mowbray Park and the Adjacent Bushland[17]

The area which is now Mowbray Park is dominated by the steep sandstone slopes and cliff line covered in dry sclerophyll forest. Where the cliff line does not meet the river there are some discontinuous patches of river flats. The plan of management for Mowbray Park (Buchanan, April 1979) gives the impression that the area is largely natural and that only a small section near the river in the east has been previously cleared. However, as was the case with all the river flats up and down the river, the drier flats here were utilised in various ways and were certainly cleared and grassy. By the 1880's and 1890's they were attracting picnickers and campers who would row upriver from Figtree Wharf. Map 14 is a composite plan (drawn from Lands Department surveys) of the river frontage of Mowbray park and the Whatmore Estate at this time.

On the river, on both sides of the end of the unmade Cullen Street (now Willandra Street) are two small portions of the 100' reservation dedicated for Public Wharfage in March, 1887. The intention of the reservation of these portions of land, with others up and down the river, was to both provide access to jetties or wharves and to act as public reserves where people might rest or picnic. Here Frankston(e) wharf was built for the route of the Upper Lane Cove Ferry Company which started operation in 1909 (see Ch.3.8). The wharf was named, it is said[18], after an early settler in this area who never objected to supplying campers with hot water and other needs. The leases of the 0.7 perch and 0.25 perch of land were taken over by Willoughby Council in 1916[19] and a wharf maintained there until 1952 when the Council, experiencing continuing problems of vandalism and maintenance, decided it was infrequently used and had the jetties demolished and the leases cancelled[20].

To the east of these portions was a small area of river flat with an old hut and a well and still used for cultivation when this part of the 100' reservation was dedicated for Public Recreation in 1908[21].

Downstream from the Cullen Street area, where there is another area of river flats on the point north of Avro Road, was a picnic area popular in the 1880's and 90's - Judy's Arm. Here, and on other riverside flats in Mowbray Park are exotic grasses such as Buffalo, probably remnants of their past history when they were cleared and used by settlers and then picnickers. The 1951 aerial photograph series shows these flats as still relatively open with wide areas of untreed (ie. grasses or grass swamp) land. However, without use or interference since then, tree cover has now filled much of these areas.

An 1898 plan (included in Map 14) also shows a 'picnic ground' on flats southwest of Judy's Arm and west of the grass swamp. It is probable that this picnic ground was the one mentioned in Gibbs, Shallard and Co.'s 1882 guide to Sydney referring to this part of the river, which described arriving

> "....at Wattle Flat on the right, easily discoverable from the bright green shade of the wild mimosa. The flat ends at an acute angle,and 'green grow the rushes, o!' to the waters edge. In the centre of the wattles is a watercourse and a nice spot to spread the cloth..."

The rushes on the waters edge probably refer to the nearby swampy areas - further evidence of grass swamps and rushes as waters edge vegetation at this time, rather than mangroves.

On the sandstone slopes of Mowbray Park the increased density of vegetation cover, discussed in Chapter 3.1, is noticeable on the aerial photographs dating back to 1951 and in photos 17 and 18 dating to the 1920's, compared with today (Photo 19). The 1920 photographs also demonstrate the relative lack of mangroves on the Mowbray Park shoreline at this time. In the earler Photo 17 they are absent and in Photo 18 they are evident as young trees in front of the casuarina fringe but where the rocks fall steeply into the water the shoreline is quite open. Today the mangroves obscure much of the slopes and even the rocky shoreline is almost fully colonised.

In ownership and management this stretch of bushland has had a chequered history, resulting in the mosaic which exists today (Map 17). The whole area was part of 3 original grants made to John Roby Hatfield, a notorious land speculator who overextended

himself and later went broke. The 100' reservation was placed along the river frontage in approx. 1880 (see Ch. 2) but under Section 63 of the Crown Lands Act, 1884, adjacent landowners could apply to purchase the section of reservation fronting their properties. When Hatfield's grants began to be subdivided, the new owners successfully made such applications and Thomas Allright Dibbs and Mrs I.R.B. Bradley purchased a section each in the late 1890's. Soon after, the eastern part of the reservation was dedicated for public recreation while the wharfage areas had been dedicated much earlier. The western part of the reservation (between Dibbs and Whatmore) was not dedicated for public recreation until 1938.

In 1929 I.M. Burke Pty Ltd dedicated a 5 acre portion of their subdivision of the Lavender Estate (Hatfield's 32 acre grant, then Mrs Bradley's) as parkland. This was named Mowbray Park and formed its nucleus. This was gradually added to by subdivision dedication and purchase by the Council. In the 1950's the Cumberland County Council also purchased various portions for addition to the Lane Cove National Park when the concept of extending the park downstream was still reasonably strong (see discussion Ch. 7).

By the 1970's the area of reserve totalled 37.5 acres of which 18 acres was Council freehold land with the remainder legally, or in effect, under Council's management. In practice, this meant the whole area was left to its own devices until August 1972 when a bulldozer began to clear an access road to the eastern flats/swamp area (near the base of the unmade Willandra Street). This was to be filled by the Council and made into more playing fields despite its small area, isolated nature and poor access.[22]

Such filling had been approved by council 10 years previously but had not proceeded. In 1972, due to development in the area, space for the dumping of excavation materials was required and a motion for work to proceed was passed. As a result of the earlier approval, Council claimed it was not obliged to inform residents and, as it obviously perceived the area as valueless in its then current state, possibly felt there was no need to inform nearby residents. A statement by Council maintained that the park was "only useless swamps" and "only good for reclamation and filling" (**North Shore Times**, 27.12.72). The environmental awareness developed in the 1960's had not yet reached Willoughby Council!

Appreciation of the values of the natural environment and of the importance of the consultative process have had to be thrust upon local government in the course of battles such as this which, if hard fought due to entrenched developmental attitudes on the part of incumbent councillors, have led to strong conservationist campaigns in the subsequent elections. Depending on the success of such campaigns and its follow-up at further elections, the nature of a local council and its aims for the community could be radically altered over a short period.

This particular controversy was very public and well reported in local newspapers. On the third day of work local residents (mainly from Avian Crescent) confronted the bulldozers and then succeeded in getting the Federated Engine Drivers and Firemans' Association to take action to stop the work until an objective assessment was carried out. The Council blustered, the Mayor told a Council meeting of 28th August that "nobody will ever stand over me with threats or scare me with pressure" (**NST**, 6.9.72) and his report on the subject was accepted without dissent.

The Avian Crescent residents became the Mowbray Park Preservation Committee and enlisted the support of the Minister for Environment Control, Jack Beale, and a variety of experts to study the park. The Minister expressed interest and drew Council's attention to "the requirements of the government's Environmental Impact policy which was advised earlier this year in the light of increased community awareness of bushland environments"[23]. He also requested a report from the State Pollution Control Commission which was carried out by Harry Recher of the Australian Museum. Meanwhile, Council was receiving letters of support from north shore sports clubs[24].

In December, 1972, on the strength of the expert reports submitted, the Minister requested the Council "to reconsider their plans" (**NST**, 27.12.72). The reports emphasised the ecological diversity of the area, its value as a remnant, the value of the mangroves and the fragmentation which would occur with such development. Thus the Council finally decided, in January, 1973, to establish a 3-man committee to study the Park in the light of expert opinion that it is an 'ecological treasure trove'. Alderman Donnelly (one of the appointed committee) probably summed up Council's feeling at the time in recognising that expert studies were needed to assess the value of the park while still believing it would be of more value to people if part of it was used for recreation (ie. active) but "I know nothing about ecology" (**NST**, 24.1.73).

1973 then saw further expert studies and reports, Council surveys, the first regular meeting of the Mowbray Park Preservation Society and attempts to persuade Council to allow volunteer hand weeding and regeneration along the bulldozer track which was being rapidly invaded by weeds. The expert reports finally culminated in **Mowbray Park: Description and**

Management published by the Society in 1979 and regeneration efforts cleaned up much bushland including the thickets of lantana along the river which had followed the earlier clearings.

Action against the hidebound attitudes of the Council was taken in 1974 when the Society and its supporters ran a very strong campaign in West Ward. As this ward takes in areas well away from the river including most of Chatswood Shopping Centre, their candidates ran on the issue of more open Council and all three were elected. However, in general, conservation groups in Willoughby have not been as successful as those in Lane Cove in achieving, and maintaining, a clear majority of aldermen sympathetic to their aims, and fierce battles still rage over various bushland management issues.

No definitive statement or resolution on the future and role of Mowbray Park has ever been made by Council but, from this time, the playing fields proposal sank further from sight while management for natural and bushland values including employment of bush regeneration teams has evolved for all Willoughby bushland, heavily influenced by conservation group pressure. The Mowbray Park group was one of the earliest of these Willoughby Groups and, having achieved its objects, has largely disbanded. However, most of its former members still live in the area and would mobilise again should a threat arise.

4.6 **Fairyland** (Portions 385 & 386)

A detailed history of Fairyland from the 1890's is given elsewhere (Pratt, 1980). This section will concentrate mainly on some of the environmental changes in the area.

The area of these two portions descends from the Delhi Road ridge to the river in moderately steep sandstone slopes clothed in dry sclerophyll woodland typical of the valley's sides. A short creek drains these slopes, crossing a flat, amphitheatre shaped area to the river. This creek is fed by springs and has thus attracted people from the aborigines on (it is claimed there are carvings, spear grinding grooves and middens near the creek above the flat but these have not been located (ibid)).

The exact nature of the flat area and how swampy it was at the time of white settlement is unclear. It was certainly settled early with a hut located on the western side of the creek on slightly higher ground by 1831. The 1847 map shows an encroachment here and other families are reputed to have lived in the area last century.

This part of the Field of Mars was not subdivided until 1896. Portions 385 and 386 were purchased by members of the Swan family in 1898. Prior to their purchase they had been weekend trippers on the river in this area, hiring a boat from Figtree, rowing up the river and camping on this site. At this time the several acres of flat land were covered in melaleucas, casuarinas (swamp oaks) and bracken fern (ibid) indicating lowlying but normally relatively dry land (these trees are found near the river on the slightly higher areas, such as levees).

The flat area was cleared and a market garden established and in the late 1890's strawberries were grown on the western side of the creek and watermelons on the larger area on the east. At least part of this land was relatively moist due to the effect of springs. It seems there may be some underground springs in the flat area as well as those upslope in the creek bed. Swamp oaks were planted along the riverbank (from which they had possibly been removed by the earlier squatters) and the now large camphor laurel was planted. A jetty was also put in and weekender houses for the family and shacks for the workers were built in the bushland above the flat area.

The general development of rowing and picnicking along the river led to picnickers calling in for strawberries and cream and eventually to phasing out of the market garden between 1905 and 1910 and development of the area solely as first picnic, and later pleasure, grounds. In 1909 Robert Campbell Swan became the sole proprietor.

Pleasure ground equipment was brought in or built and a soft fern known as Tender Brake (Pteris tremula) (a NSW native) was planted with the phoenix palm, pines and other exotics. Whether it had been originally, the flat area was now liable to floods (caused, or exacerbated, by silting of the river and settlement in the catchment - see Ch. 3.4) and were kept as open grassed areas for games and races. Over the years the existing creek was deepened and other drainage channels dug. The creek inlet was filled in with sand from the 1909-10 dredging and a simple tidal gate installed to control the flow.

Various shelter sheds and an open Dance Hall (built 1930) were built on the higher ground close to the river. Some of these, including the Dance Hall survived until burnt down by the Lane Cove River State Recreation Area Trust in 1980 (they were concerned about possible vandalism!). The area was operated almost continuously by the Swan family from early in the century until the late 1960's. It was sold in 1972 (upper bushland section)

and 1977 (riverside section) for addition to the SRA as the area had been zoned open space since the County of Cumberland Plan.

In the few years since it ceased operation all the buildings and installations have been destroyed and only traces of Fairyland remain. The bushland slopes changed little over the years as there was only minimal development (Swan family housing and an access road). Picking of wildflowers by visitors to Fairyland was not permitted and there is little development on the ridge above to affect this downslope area. Today the bushland is still sufficiently open to support a relative profusion of wildflower ground species such as flannel flowers.

However, the flat area has undergone considerable changes over the years. It has now become a freshwater swamp of rushes and grasses with a considerable number of camphor laurels which have seeded from the early planting. Pratt states this is a 'reversion' whilst recent SRA plans for this area also accept this as a reversion to its former 'natural' state[25]. However, the historical evidence, scanty though it is, does not support this contention. It has always been a relatively low-lying area, possibly always subject to sporadic flooding and with some moister areas due to the influence of springs. However, it is unlikely that it was swamp with a permanent body of fresh water as it is at present[26]. As a swamp it would have provided no attraction for the squatters who used it prior to the Common subdivision. It is also highly unlikely that the Swans, a relatively well-off family, able to afford to purchase and run this area as a weekend retreat employing others to work it, would have purchased a swamp as a market garden, particularly as all the riverflat portions just upstream were on sale at the same time and passed in several times.

In addition, there is some evidence of the species growing on the flat area at this time ie. ti-trees, paperbarks, swamp oaks and bracken fern. These do not indicate a wet swamp habitat.

It is quite likely that the various alterations to the drainage of the site made during the Swans occupation eg. filling the creek inlet and its closure by a tidal gate, when not operated and maintained, have disrupted the former drainage pattern of the site, effectively damming the waters of the springs and allowing a freshwater swamp to develop. This creek, once deep enough for fish is now only a few centimetres deep where it flows from the swamp to the river. It is also possible that flooding of the river with its heavy loads of silt exacerbated the problem by further building up the levee and filling lines of natural drainage.

Notes and References

1. NSW State Archives AO Map 10179, reproduced in Russell (1970), p.63.
2. Lane Cove Council files, Local History Section, Lane Cove Library.
3. Lands Department Plan 36-2603, Plan of Proposed Reserves in the Field of Mars Common, 1882.
4. Maritime Services Board Records.
5. Sources for the history of the Field of Mars Reserve were files and documents of the Ryde - Hunters Hill Flora and Fauna Preservation Society and the Field of Mars Draft Plan of Management (Ryde-Hunters Hill Flora and Fauna Preservation Society, 1976).
6. Ryde-Hunters Hill Flora and Fauna Preservation Society Newsheet, October, 1967.
7. Field of Mars Draft Plan of Management, January, 1976.
8. Maritime Services Board records.
9. Effected 18.6.52. Sources for the history of the tip were files and Minutes of the Lane Cove National Park Trust.
10. This height is also mentioned in a letter from Ryde Council requesting permission for the tip from the Dept. of Public Health, 6.1.59.
11. Letter from Maritime Services Board to Trust 16.4.59.
12. Letter from Maritime Services Board to Trust 8.4.59.
13. The following details on this application are from Maritime Services Board files.
14. Survey by Larmer, November, 1832. Lands Department Plan 87.690.
15. Letter to Willoughby Council, 5.1.62.
16. By the Rotary Club - material from Vertical Files, Willoughby Municipal Council Library Local History Collection, Rotary Athletics Field File.
17. Area as covered by the Mowbray Park Plan of Management (Buchanan, April, 1979).
18. John Plummer, Vol.49, p.37.
19. Willoughby Municipal Council File Misc 153/1925, Willoughby Library Local History Collection.
20. Willoughby Municipal Council File Misc 29/1952-3-4, Willoughby Library Local History Collection.
21. Lands Department Plan 2908.3000.
22. Account of the following controversy derived from newspaper cuttings file of the Mowbray park Association and Vertical Files, Willoughby Library Local History Collection.
23. Telex to the Town Clerk, 28.8.72, Mowbray Park Vertical File, Willoughby Library Local History Collection.
24. Copies in location cited above.
25. Ian Brown, Manager Lane Cove River State Recreation Area to late 1984, pers comm.
26. The area was not examined in a drought period.

PART II
RELEVANT ISSUES

CHAPTER 5

ABORIGINAL USE OF FIRE AND THE BUSHLAND

The management of bushland in, and adjacent to, the Sydney urban area is a matter of considerable debate and even confrontation at present. Involved in this debate are local councils, conservation groups, the Board of Fire Commissioners and various government bodies, such as the service authorities and the National Parks and Wildlife Service.

The most fiercely and emotionally fought issue is that of fire management, particularly in regard to prescribed burning (regular deliberate burning of the bushland adjacent to houses to reduce the fuel load and thus the potential fire hazard). However, not only is our knowledge of the reaction of species and communities to fire (and the lack of fire) relatively limited, but these debates take place from diametrically opposed viewpoints of no burning at all (conservationists) vs prescribed burning as often as every three years (Board of Fire Commissioners, some local councils). They also tend to be argued from limited information bases, each side selecting only those known facts which suit its purpose.

The purpose of this chapter is to add a time dimension to the debate. At present, arguments are based on the current state of the bush, assumptions about the past and recent, relatively short term scientific studies. This chapter aims to put fire in the Sydney/North Shore bushland in historical perspective by examining the evidence regarding Aboriginal burning and likely pre-white fire regimes.

There have been no specific studies of the aboriginal use of fire in the Sydney district. However, it is useful to examine the general trends of recent work on the aboriginal use of fire in Australia, then to examine the evidence available at present relating to the North Shore and the Lane Cove catchment.

5.1 General Overview

There has been considerable debate in the last 15 years over the extent and effect of pre-contact Aboriginal burning in Australia, particularly since Jones (1969) introduction of the concept of 'firestick farming' by Tasmanian Aborigines. There has been a marked reluctance in ethnological work world-wide, to accept the possibility that hunter-gather societies could have utilised fire as an important tool in shaping selected habitats for more efficient resource use in the same way as the supposedly more 'advanced' farming societies. This has also hampered the debate in Australia.

Arguments have been based on ethnographic evidence, the pollen and charcoal record, geomorphic evidence and direct observation of recent practices in areas such as Arnhem Land and Central Australia. It is now generally accepted that Aborigines did, and do, use fire as an aid to extracting resources from their environment. However, the debate still rages over the frequency and intensity of such man-induced fires (as opposed to the natural fire regime), the degree of environmental knowledge with which the Aborigines actively manipulated ecosystems, their contribution to late Quaternary megafaunal extinctions and the extent to which Aboriginal firing caused changes in Australian vegetation. On the last point, argument has centred on their effect on gross vegetation patterns, that is, the extent to which they altered vegetation zones and dominant species such as the balance between rainforest and sclerophyll forest and between grasslands, open scrub and woodlands.

A strong case has been presented by workers such as Jones (1969), Hallam (1975), Nicholson (1981) and Kimber (1983) for deliberate and controlled burning by Aborigines, closely linked to their seasonal subsistence movements. It is in many ways similar to the seasonal burning regimes described by Lewis (1982) as employed by Indians in Northern Alberta, California and Oregon and which varied according to each environmental zone and the resource required.

Horton (1982), however, disagrees with these trends in evaluation of Aboriginal burning to argue that Aborigines were more passive users of nature - observers waiting for natural fire and regeneration and utilising the succession of plants and animals as they appeared. He maintains fire is a natural part of the environment and they merely supplemented natural fires to achieve a postulated 'natural fire regime' where natural ignition rates were low. However, if particular areas have a low ignition rate, then their 'natural fire regime' is of low frequency. For man to introduce further fire is to

artificially manipulate the environment. It is not passive observation. In addition, if the aborigines could use fire as a tool in this small way why should they not have used it to a greater extent to ensure their precarious food supplies?

Robin Clark (1981, 1983) presents perhaps the most reasonable overall picture of use of fire by aborigines in Australia between the extremes of the 'firestick farming' model with the assertions that Aboriginal burning caused major shifts in vegetation zones, particularly in the creation of grasslands, and Horton's model of hunter-gathers 'in harmony with nature', waiting for natural changes. She points out that, over thousands of years, Aboriginal burning probably had little effect on major vegetation zones compared to the changes wrought by climate. However, on the more local scale and within the period prior to European contact, fire must be seen as one of the factors, along with local microclimate, soil, topography, floods and winds, influencing the mosaic of vegetation produced, and Aboriginal burning as contributing to that mosaic. Aboriginal burning regimes would have varied regionally and locally according to the environmental zones, the resources able, and desired, to be extracted from them and other reasons for burning.

Lewis' (1982) conclusion regarding the Indians of Northern Alberta is useful by analogy to the Australian context:

> "The overall impact of Indian burning was to intensify further and to help maintain a more pronounced mosaic of micro-habitats even than that which occurred naturally as a result of varying edaphic and closely related factors (eg. water tables, exposure and the more infrequent, unpredictable, often disruptive intrusions of natural fire).....they altered natural processes in ways that allowed them to plan for and create the kinds of environmental conditions favourable to their adaptations as hunter-gathers."

It is on this more local scale that further investigations are needed, particularly in the light of current controversies over prescribed burning of, and fire in, bushland in and around built-up areas. Debate over the effects of Aboriginal firing on vegetation has, in the past, centred on the gross changes while its effects on species numbers and diversity within these zones has been largely ignored, possibly because few specialist botanists, biologists or ecologists have entered the field and the debate rages largely in the anthropological literature.

Fire is one factor which places strong selection pressure on species. Thus the species composition and their fire adaptations or sensitivity, of different areas should be able to tell us much about the past fire history of those areas, as well as directions for future management. For example, Gill (1981) talks of 'indicator' species for heathland management by fire regimes, according to categories of fire sensitivity, particularly with regard to return fire frequency. These indicator species thus also indicate the minimum fire spacing of past regimes. In Sydney sandstone vegetation, Banksia ericifolia is one such species, relatively well studied and oft quoted, which indicates that the minimum pre-contact fire spacing in the sandstone areas was 5-10 years for this species to survive in particular areas. If fires were more frequent locally and eliminated the species, re-establishment would probably require seed from nearby areas. At 10 years nearly maximal seedbank is available and a fire is then required sometime before the degenerate phase (30+ years) for successful continuation of the species, both to start the dessication process which opens the follicles to release the seed, and to clear the foliage to allow the seedlings to grow (Bradstock and Myerscough, 1981).

A study of fire sensitive species (ie. those killed by fire which regenerate only from seed) in Hawkesbury Sandstone vegetation, by Benson (1984) found maturation periods of 2-7 years for different species. This also indicates a probable minimum pre-contact fire spacing of 8-10 years.

5.2 The Lane Cove Valley Catchment

Aboriginal settlement around Sydney, over thousands of years, seems to have depended on the sea as a major food source. Thus, as sea level rose from 100-150 metres below the present level, Aborigines moved across the former coastal plain to the present Sydney Basin and its coastline. The present sea level was reached about 6,000 years ago and has remained stable during Holocene times. Between 8000 and 6000 years ago occupation of sites in the Sydney area became archeologically visible but the greatest increases in use of the area occurred over the last 5000 years (Lampert & Hughes, 1982).

In drill samples from the Lane Cove River Carey (1980) has found a distinct zonation in the sediments. At -8 to -10m, representing 5-6000 B.P. there is a layer of large thick-shelled bivalves. Below this layer charcoal is minor while above it charcoal is abundant. Great quantities of charcoal were also found in the river, as deep as approximately -10m, by W. Davidson who dredged from above the weir to Figtree Bridge and described it as being "more than in any other river I've ever dredged". The relative lack

of charcoal in the lower layers can be explained by differences in the river's sorting processes as it flowed to a lower sea level (ie. at this stage the finer lighter charcoal was washed further out). However, can the large quantities of charcoal deposited in the river after the rise in sea level (and the area's settlement by aborigines) be explained by a purely natural fire regime? It is quite possible that it represents more frequent burning due to intensified Aboriginal use.

Hughes and Sullivan (1981) have found some geomorphic evidence which lends support to this possibility in the history of sediment accumulation around rock shelter archaeological sites eg. in the sandstone catchment of Mangrove Creek, north of Sydney. They found the commencement of occupation in the late Holocene coincided with the onset of sediment accumulation. They argue that, prior to aboriginal use and under natural fire regimes, there was a long term balance between erosion, transportation and deposition but widespread use of fire by Aborigines, by removing litter and groundcover, resulted in hillslope instability. They also quote other studies of valley fills in Wollombi Brook, Colo River and other locations in central and northern N.S.W. indicating accelerated deposition in the late Holocene period when neither major climatic change or sea level change could be responsible but intensified Aboriginal land use could well be.

The ethnographic evidence for burning practices in the Sydney region is limited because traditional living patterns altered rapidly after January, 1788 due both to the disruptive influence of the settlement itself and the fact that the Sydney Aboriginal population was disastrously reduced by smallpox in mid 1789.

However, there were frequent mentions of smoke and fire in the First Fleet journals, including fires directly observed being lit by aborigines. There are also some more general comments on burning practices:

> "They (the aborigines) also, when in considerable numbers, set the country on fire for several miles extent; this, we have generally understood, is for the purpose of disturbing such animals as may be within the reach of the conflagration; and thereby they have an opportunity of killing many. We have also had much reason to believe, that those fires were intended to clear that part of the country through which they have frequent occasion to travel, of the brush or underwood, from which they, being naked, suffer very great inconvenience. The fires, which we very frequently saw, particularly in the summertime, account also for an appearance,.....that two thirds of the trees in the woods were very much scorched with fire, some were burnt quite black up to the top...we sometimes, upon our arrival here conjectured that it proceeded from lighting, but upon looking farther, it appeared too general amongst the woods to be occasioned by such an accident."
>
> Journal of Captain John Hunter
> (Bach edition, p43).

> "The weather now being very dry, the natives were employed in burning the grass on the north shore opposite Sydney, in order to catch rats and other animals, whilst the women were employed in fishing: this is their constant practice in dry weather."
>
> Governor Phillip's Journal, Sept. 1790
> (Bach edition, p.312).

These excerpts, from the journals of some of the highest officers of the First Fleet are quite clear regarding the extent of deliberate burning by Aborigines and the reasons for it. As a practice apparently widespread yet alien to their experience and, with the First Fleet officers fascination with all matters Aboriginal, they would have attempted to find out what they could about it from the Aborigines who came into the settlement. Their comments are unlikely to contain fabrication or supposition.

Comments on Aboriginal burning were also made by George Worgan, surgeon of the **Sirius**, describing a trip to North head on 28th May, 1788:

> "...returning we made a circuit over to part of the hill where we observed a great fire. We found it to be burning of healthy brushwood, which we supposed the natives had set on fire for some purpose, but what we could not conjecture. We observed likewise fires of this nature in several other parts of the country.
> "The wind was blowing very fresh today and perhaps this might favour their designs....Indeed we have remarked that, whenever the wind blows strong, there are a number of these kinds of fires about the country."[1]

Whether the burning was all deliberate, or included some accidental escapes on these windy days from the lighted sticks they carried about with them, the burning was certainly frequent.

It is also noteworthy that the proximity of these fires caused little concern to the

early expeditions into the countryside, indicating that they were quite mild, trickle-type grassfires. Such lack of intensity in the fires also indicates low available fuel, that the fires were thus probably frequent and/or that fuel did not build up as rapidly as it does today (see also Ch. 3.1). If the Aborigines were starting fires on windy days they must have needed the wind to drive them through much sparser vegetation.

The evidence for aboriginal maintenance of grasslands by burning in many parts of the country is very strong (Gould 1971, Hallam 1975, Flood 1980, Clark 1981, Nicholson 1981). On the basis of the above ethnographic evidence of burning practices in the Sydney region and on the North Shore, the native vegetation found by the white settlers (see Ch.1), and the charcoal and geomorphic evidence, the most likely fire regime which can be postulated at this stage for the shale ridges of the Lane Cove Valley catchment would have been as frequently as annual burning of the grasses under the tall forests. These fires would have been very mild, serving several purposes: keeping the ridges clear of brush for ease of travel, encouraging new growth for larger mammals and thereby also locating the game, making the hunting of smaller animals (lizards, possums, rodents) easier and keeping down shrub invasion of areas of bracken fern, whose roots were an important source of carbohydrate.

According to Ross (1976), the Kuringai's movements were north-south through their coastal territory and this would coincide with the north-south alignment of the topography and the shale ridges carrying the tall forest with grass understorey easily kept open for travel.

On the sandstone slopes of the catchment the reasons for burning were not quite the same and the recent, still scanty, biological evidence on the fire sensitivity of species indicates greater fire spacing than on the ridges but fires were still possibly more frequent than under a natural regime. Recent studies of fire sensitive species indicate probable minimum spacing of 7-10 years in any one area but cannot tell us the actual range. However, if the vegetation consists of species adapted to this minimum, it is likely that it was fairly common. At any one time, the overall pattern on the sandstone would have been an irregular mosaic of burnt areas and areas in various stages of regrowth.

On the sandstone the reasons for burning were probably: access to the river and harbour from the ridges, promotion of vigorous regeneration of shrub food resources, such as geebung (Persoonia sp.) and native currants (Leptomaria acida and Leucopogon sp.), and as a method of hunting small animals, as mentioned by Captain Hunter (quoted earlier). Gould (1971) and Hallam (1975) describe hunts or drives in other parts of Australia where fire was used either to expose the burrow entrances, eg. of mice, or to flush out the game. Early accounts in the Sydney area describe the setting of fires in hollow trees to snare animals[2]. Kimber (1983) also describes the 'cleaning' functions of fire.

The advent of white settlement soon began to alter the vegetation pattern of tall forest with little undergrowth. Major Mitchell certainly attributed this to a changed fire regime and, in 1848, commented that "the omission of the annual periodical burning by natives, of grass and young saplings, has already produced in the open forest lands nearest to Sydney, thick forests of young trees, where formerly a man might gallop without impediment and see miles before him"[3].

It is possible that, by opening up the forest, logging could also have caused these changes but whatever the cause of the changes in the vegetation structure, a new fire regime did develop - less frequent but hotter and wilder bushfires fed by the fuel of the shrub understorey. The changes noted by Major Mitchell in 1848 were underscored in 1850 by a great fire which swept the North Shore from Hornsby to St Leonards, an area described as being then dense forests and thick undergrowth prior to the fire.[4]

5.3 Implications

An understanding of the fire regime in Sydney bushland prior to white settlement is important to decisions on future management of this bushland. It is increasingly obvious that the bushland within, and close to, the urban areas requires quite intensive management in respect of both its potential fire hazard, the type of bushland, desired and its desired uses. Changes occurring in the bushland which are, in part, due to changes in fire regime, are described in Ch. 3.1.

The management decision-making process must involve three basic steps:

1. The gathering of knowledge to provide an understanding of the formation of the variety of bushland habitats. Fire must be seen as an important contributor to the species composition of the mosaic of vegetation systems - frequency, intensity and seasonality both prior to, and since, white settlement and the changes that a changed fire regime have, and are, producing in these systems.

For example, it is possible that the Aboriginal pattern of burning, particularly of the sandstone vegetation, led to a greater variety of vegetation systems than may have occurred under the natural variation of edaphic factors, and that exclusion of burning probably reduces this variety.

Intensity of burns is another factor which has recently been under scrutiny with an assumption that the 'natural' fire regime is of hot wild fires in summer, therefore the 'cool' prescribed burns of autumn must be damaging. But the hot wild fires may not have been 'natural' for 4000 years. Bradstock and Myerscough (1981) found that hotter burns of Banksia ericifolia merely resulted in faster (not greater) seed release and that if such a burn was followed by a dry period, survival of seedlings would be poorer. Milder burns with seed release over a longer period result in variation in age and greater chance of cool wet weather following germination for some seedlings. If the Aborigines burnt reasonably frequently, fuel would be relatively low and burns milder. (It should be noted here that return fire frequencies used today to keep fuel low on the sandstone vegetation near urban areas do not apply to the pre-white period for reasons discussed in Ch 3.1.) Also, the Aborigines burnt in 'dry' periods and, in Sydney, these may occur at any time of the year.

In all these areas a great deal more work specific to Sydney bushland is needed to arrive at an adequate picture.

2. Decisions must be made on the type of bushland areas and communities we wish to maintain and for what purposes. Absence of fire causes structural changes in the bushland just as does burning of sandstone vegetation with a lower than 5 year return frequency. Thus, on the basis of knowledge of bushland communities, planning should proceed from consideration of the type of bushland required in particular areas, to the most appropriate methods of achieving and/or maintaining it. These decisions may require considerable participation by, and consultation with, a variety of interested parties, both local and governmental. Required uses may range from a green backdrop of low fire hazard near houses to active recreation such as bushwalking, orienteering and horse riding, educational purposes or low disturbance fauna protection.

At present, although the debate over hazard reduction burning and issues of bushland protection rages fiercely, there has been little attempt to arrive at such decisions through logical and consultative processes. The current position in some areas, for example Willoughby, with opposing groups staunchly maintaining extreme views in a limited context on the use of fire is not a particularly productive way of achieving such decisionmaking goals, especially with regard to the type of bushland we wish to maintain. In the Lane Cove municipality consensus has been reached but only between the Council and the local conservationists. Lane Cove Bushland and Conservation Society, operating within a relatively small municipality, was sufficiently organised to gain, and retain for many years, a majority of aldermen on Council relatively sympathetic to their aims for the past 10 years. Thus fire is excluded from the small pockets of Lane Cove bushland.

Likewise, the Federal House of Representatives Standing Committee on Environment and Conservation's Inquiry into the Environmental Impact of Bushfires which held hearings in Sydney in late October, 1983, whilst allowing the broadest base of representation from interested parties (again largely Councils and conservation groups), is oriented predominantly to the problems and prevention of bushfires rather than the broader scope of the role and impact both of fire, and the lack of fire, in the bushland.

3. Once decisions have been made on the nature of the bushland we wish to maintain, decisions on management methods within the relevant economic framework can be made. Fire may be one of the management tools required - not just for fire hazard control but as manipulation of the vegetation systems such as intended by the National Parks and Wildlife Service in the management of some of its parks.

N.B. Further conclusions and possible management plan for general bushland maintenance in areas affected by urbanisation are presented in the Conclusions at the end of this study.

Notes and References

1. Letter from George Bouchier Worgan to his brother, Dick, June 12-18, 1978, quoted in J. Cobley, **Sydney Cove, 1788.**

2. For example, Surgeon John White in **Journal of a Voyage to NSW** on an expedition to Prospect Hill in 1788.

3. **Journal of an Expedition into the Interior of Australia** J.L. Mitchell, 1848.

4. **The Suburban Herald** 20.9.1928.

CHAPTER 6

THE ROLE OF MANGROVES ON THE MIDDLE LANE COVE RIVER

Almost all the mangroves in the Lane Cove River occur along the middle section of the river ie. between Figtree Bridge, Hunters Hill and Fullers Bridge, West Chatswood. Within that section, they line almost the entire length of the banks. Thus possible uses of the river and its foreshores can be significantly affected by decisions made about the importance of these mangroves or, vice versa, the mangroves may be significantly affected by decisions on uses.

The aim of this section is to critically examine the evidence available regarding mangroves, especially as it pertains to the Lane Cove River mangroves, and to put the mangroves here into perspective approached from several points of view:

1. a bio-ecological perspective regarding what is known of their role in food chains and as animal habitats,

2. an historical perspective allied with spatial considerations of their place in mangrove distribution in the Sydney region,

3. a human perspective as they affect, or may be affected by, current or potential uses of the river and its foreshores.

6.1 Biological Perspective

Estuaries and their wetlands are being recognised worldwide as complex combinations of ecosystems of great environmental, and even commercial, significance. Physically, wetlands act as a natural drainage buffer zone, gradually releasing excess stormwater to the estuary, thus reducing the impact of floods and erosion along river banks,. They also operate as traps for sediment and pollution to help maintain water quality.

Biologically, they contribute considerable quantities of organic detritus to food chains, recycling nutrients to the soil and adjacent waters and they provide sheltered nurseries for juvenile fish and crustaceans.

Mangroves vary in their importance in the complex of estuarine ecosystems. In tropical Australia they tend to occur in large areas, many hectares in extent with a variety of species in a distinct zonation pattern, associated with the large quantities of silt brought to the coast by the rivers. Further south, in the temperate regions, where the quantities of silt built into intertidal mudflats is not as great, mangroves are more limited in extent - to fringe belts with occasional larger patches - while the cooler temperatures limit species diversity. In these regions, saltmarsh, either on its own or on the landward edge of a mangrove zone, may occupy significant areas.

The present[1] productive complex of wetland systems on the N.S.W. central coast, of zones of Posidonia and Zostera seagrass beds, mangroves and saltmarsh is shown below.

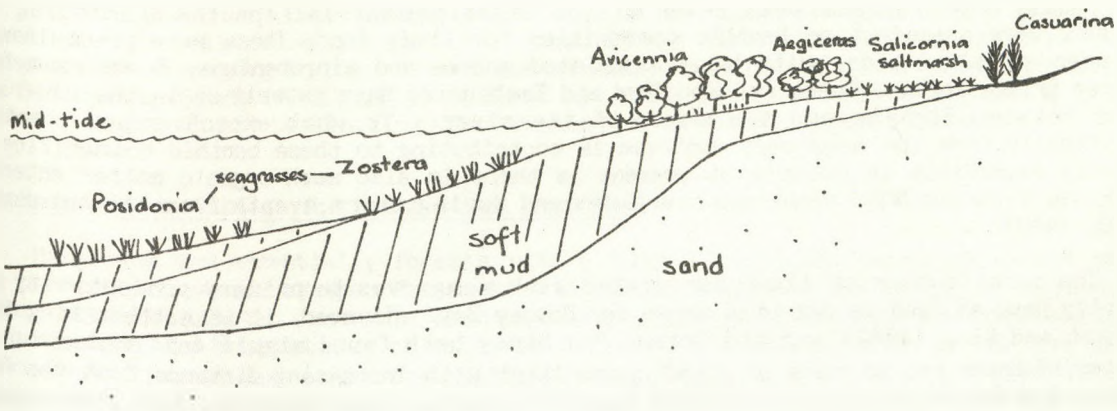


DIAGRAM 3 Generalised profile of the present complex of wetland systems on the NSW coast

In the Lane Cove River this pattern has been considerably distorted with significant reductions in saltmarsh, and possibly seagrasses, yet extension of mangroves. The once extensive saltmarsh and grassed flats upstream have been largely filled for other uses or colonised by the mangroves. Increase in fine siltation from approximately the mid 19th century and dredging this century have destroyed any seagrasses which may have existed in the middle section of the river. The mangroves have both extended the area of their former patches such as islands near Boronia Park and colonised a narrow fringe along most of the banks upstream of Figtree. These mangroves are thus disjunct from the only existing seagrass beds in the river - in Woodford and Tambourine Bays. Above Figtree the mangroves cover an area of approximately 23.7ha with a further 2.3ha downstream in Burns Bay and Tambourine Bay (Carol Thorogood, State Fisheries, pers comm.)

Mangrove Island, in the vicinity of Figtree Bridge, marks the upper limit of an estuarine environment in the river. Up to the Figtree area sea water is only moderately diluted under wet weather conditions (SPCC, 1979) and is thus the limit of marine conditions. Further upstream, to the weir, euryhaline organisms prevail.

The major bio-ecological grounds on which the current fervour to preserve and replant mangroves (eg. Lynch, Spence and Pearson, 1976) is based are:
a) their productive role in contributing detritus to food chains.
b) their role as fish and prawn habitat, especially as a juvenile nursery.
c) their provision of habitat for other creatures, particularly birds.

The first two tend to be emphasised for their perceived contribution to fishing and commercial species.

a) Productivity

The contribution of mangroves to estuarine food chains should be considered along with that of seagrasses. Mangroves have a comparatively high biomass but approximately 95% of this is tied up in roots, trunks and branches (Attiwill & Clough, 1975, quoted in SPCC, 1979) thus binding considerable quantities of estuarine organic matter. Productivity, as measured by litter fall (mainly leaves, fruits and flowers), of mangroves in Middle Harbour has been measured at 5.8t ha^{-1} yr^{-1} falling mainly in late spring and summer (Goulter and Allaway, 1979). This litter then decomposes quite rapidly with a half life of 8 weeks. This litter fall and decomposition rate would be similar for the Lane Cove mangroves which are the same species in a similar environment (Allaway, Sydney University, pers. comm.).

Larkin (quoted in SPCC, 1979) gives a figure of 8t ha^{-1} yr^{-1} production from Botany Bay seagrasses whilst Dunstan (State Fisheries, 1979) gives 10t $acre^{-1}$. Thus, where seagrasses are present they are relatively more important in gross productivity. However, the manner in which the detritus from both these sources is used in food chains, and whether they differ, is not yet known. In their main growth period mangroves would be net importers of organic matter of the estuary, particularly where new areas are being colonised.

The most efficient use of mangrove production is when larger or commercial species are direct detrital feeders. Prawns appear to feed on detritus along the edge of the mangroves where the detritus is washed out into the mud. Of the eight common commercial species of fish examined from the Lane Cove River, only two, the mullets Mugil cephalus and Liza argentea, were direct detrital feeders for at least part of their diet (Pulley, 1980). Where the detritus must be utilised by successive levels of the food chain before reaching the fish the significance of the 150t (137t from above Figtree) per year of total litter from Lane Cove River mangrove detritus becomes much less due to progressive losses of efficiency.

Pulley (1980) found that seven of the eight commercial species (including the mullets) were dependent on benthic communities for their food. These were predominantly the weed and algae beds, with their associated macro- and microbenthos, downstream from Figtree Bridge in Gore Creek and Woodford and Tambourine Bays as well as in the mid-river flats between Figtree and the mouth of the river. To what extent organic matter specifically from the mangroves upstream is contributing to these benthic communities is probably impossible to measure at present as there is also much organic matter entering the river from the NOOS sewerage overflows and during storm events from the catchment (SPCC, 1980).

The contribution of algae associated with mangroves to primary productivity and directly used as food is not even known for Botany Bay. However, it is worth noting that Farrant and King (1982) and the Botany Bay Study both found significant reduction in species richness and biomass of algal communities with increasing distance from the Port Jackson and Botany Bay heads ie. from the open ocean or completely marine environment. The Lane Cove River above Figtree is considerably further upstream with consequently lower salinity, greater variations in salinity and greater turbidity, which all seem to act to lower algal growth.

b) Mangroves as Fish Habitat and Nursery

In his surveys of fish in the Lane Cove River in 1976-77, utilising 8 sampling stations evenly distributed between the mouth of the river and the weir Pulley (1979) caught 70% of all species (commercial and non-commercial) below Figtree Bridge. Upstream from the bridge diversity rapidly falls off as does abundance, indicating the preferred habitat is the major food source area of the sand and mudflats and seagrass beds of the lower river.

Several other studies of the fauna of estuarine areas have demonstrated the importance of the seagrass beds. In Botany Bay (SPCC, 1981) the Zostera seagrass habitat supported the greatest number of fish species and the highest abundance and biomass of fish while the mangroves and shallow mud had the lowest species richness. Hutchings and Recher (1974), in a study of the fauna of Careel Bay found the Posidonia, and especially the Zostera, beds very rich in invertebrate fauna and juvenile fish.

Pulley's data also shows that the Lane Cove River is an important nursery for juvenile fish of many species but most are again found in the lower part of the river on the weed beds or shallow sand flats. In commercial species, these were flathead (Platycephalus fuscus), whiting (Sillago ciliata), sand mullet (Myxus elongatus), leatherjacket (Meuschenia trachylepis) and silver biddy (Gerres ovatus).

The flat-tail mullet (Liza argentea) and the sea mullet (Mugil cephalus) are the major species to distribute throughout the river to the weir, both as adults and in large numbers as juveniles, especially the sea mullet. The Botany Bay fish study (SPCC, 1981) found that juvenile flat-tail mullet consume large quantities of insects which were presumed to be associated with the mangroves whilst the algae growing on the roots may also be a food source for juvenile mullet.

Yet, apart from whiting and leatherjacket all the fish mentioned above were dominant species, found as juveniles, in the mangrove habitat in the Botany Bay Study. They also found luderick (Girella tricuspidata), which has only infrequently been caught in the Lane Cove River in any stage of its life cycle, and bream (Acanthopagus australis), also not as common in the Lane Cove as in Botany Bay and the Hacking River.

The explanation for the differences in the apparent utilisation of mangrove areas by juveniles in Botany Bay and the Lane Cove River probably lies in the relationship between mangroves and other habitats present. The Botany Bay Study emphasises the interactive nature of the eight different habitat types it identified, encompassing deep sand and shallow areas, hard and soft, sand and mud substrates as well as Zostera and Posidonia seagrasses and mangroves. With such diversity and complexity of habitats, the fish fauna of Botany Bay is relatively diverse and juveniles tend to move between habitats, especially between the seagrass beds and the mangroves at various stages of their growth. There may also be diurnal and tidal movements between these habitats when they are in close proximity. In the Lane Cove the mangroves above Figtree are well upstream of the seagrass and sand/mud flats, thus may simply not be being utilised, sufficient food and shelter being available in the lower reaches, with the exception of the insect-loving flat-tail mullet and the migratory sea mullet. In this context, the mangroves of Burns Bay and Tambourine Bay should be regarded as of greater importance as possible shelter and nursery for juveniles due to their proximity to the seagrass beds.

In addition, the river above Figtree is even less marine in nature than the lower section and is thus intrinsically a less suitable habitat for many fishes. In general a reduction in the number of species in the upper reaches of an estuary can be expected due to at least three factors: decreasing and fluctuating salinity, decreasing habitat diversity and less effective tidal exchange (Paxton & Collett, 1973).

In the Lane Cove River the nature of much of the mangrove area itself may also be unsuitable for extensive use by fish. Much of the river's mangroves exist as narrow fringe belts of varying widths without the creeks, channels and ponds which fish utilise. The Botany Bay Study (SPCC, 1979) pointed out that, even in those large areas, lack of channels and ponds may be limiting fish utilisation of the mangrove woodland.

c) Mangroves as Habitat for Fauna other than Fish

Mangroves are essentially forests with a muddy, intertidal substrate, where marine and terrestrial systems merge. For much of the fauna mangroves are merely an extension of their 'normal' habitat from the landward or estuarine directions and the abundance, distribution and adaptations of animals follow the same patterns as for the nearby terrestrial forest and estuarine mudflat. Relatively few animals are restricted to mangroves (Hutchings and Recher, 1982) and those that are, largely occur in the tropics where the greater diversity, extent and structural complexity of mangrove forests results in increased diversity of inhabiting species and mangrove specialists and endemics.

Mammals The Lane Cove Valley is generally depauperate in mammals (Stephens, 1978). Species which may possibly be present in the valley and utilising mangroves are the eastern water rat (Hydomys chrysogaster) which forages regularly in mangroves, bandicoots, the brush tailed possum and rodents which may enter and obtain some food there (Hutchings & Recher, 1982).

Birds "Birds are a conspicuous component of all mangrove forests although they are not abundant.....The comparative uniformity of structure within the canopy of mangrove forests, which provides little variety of foraging surfaces, (may) account for the small number of individuals" (Hutchings & Recher, 1982). Fragmented distribution of mangroves, limits on feeding time for ground foragers and limited nest sites may also contribute.

With the lack of floristic variety in the temperate mangroves, there are few mangrove specialists - near Sydney there is only one species, the mangrove heron (Butorides striatus) which is restricted to mangroves (Hutchings & Recher, 1982). This species has been seen infrequently in the mangroves of Tambourine Bay (Dixon, 1980) but it is not recorded as present in the mangroves further upstream at Mowbray Park (Buchanan, April 1979).

In the Lane Cove Valley, species which utilise mangroves while not being restricted to them, are the aquatic and wading birds (eg. herons, cormorants and sandpipers) which may forage among mangroves as well as on the mudflats and use the trees as high-tide and night-time roosts (but can use other trees if nearby). The pied cormorant (Phalacrocorax varius) and the straw-necked ibis (Threskiornis aethiopicus) nest in mangroves and the honey-eaters visit mangroves for nectar when they are in bloom.

For wading and diving birds the Zostera seagrass beds are more important than the mangroves. With their high populations of invertebrate fauna the seagrass beds are an important feeding ground. Hutchings and Recher (1974) found this zone was the most important feeding ground for birds at Careel Bay.

Invertebrates Eighteen species of spiders have been noted in the Careel Bay mangroves (Hutchings & Recher, 1974) and 35 in Botany Bay (Aust. Littoral Society, 1977 quoted in Hutchings & Recher, 1974) and diversity has been found to increase rapidly towards the tropics. However, all spiders recorded from mangroves also occur in other terrestrial habitats.

Examined in a limited way as yet, there is also a considerable variety of marine invertebrates as the mangroves provide additional, less harsh habitat than the exposed mudflat but in temperate areas most of the marine fauna in mangroves is also found on adjacent muddy or rocky shores. The encrusting fauna (eg. oysters, barnacles and mussels) tend to congregate at the edge of the mangroves to obtain a long period of inundation. At Careel Bay, crabs were common in the mangroves (4 species) and these mainly fed on the algae on the bases of the trees and the pneumatophores. The amphipod Ampithoe sp., important in shredding the mangrove leaves, was also common while 16 species of molluscs were found. The polychaete fauna was found to be virtually restricted to the channels and creeks which flow through the mangroves.

At Towra Point, Botany Bay, Robinson and Gibbs (1983) found that the seagrass supported a community of consistently high diversity with a mix dominantly of gastropods, bivalves, worms and crustacea. Yet crabs and gastropod molluscs almost entirely dominated the mangroves. Whilst no such study of Lane Cove River mangroves has been completed, other studies of riverine mangroves at Brookyln in the Hawkesbury, the Myall River and at Fullerton Cove in the Hunter River (all quoted in Robinson & Gibbs, 1983) have shown that fluctuations in salinity and, in some, absence of seagrass beds leads to a much reduced invertebrate fauna in the mangroves compared to the far more marine Careel Bay and Botany Bay which both also have adjacent seagrass beds.

Some evidence of the relative value for invertebrate fauna (and thereby also for waterbirds and fish) of the Lane Cove River above and below Figtree, where the limit of the estuarine environment is approached, comes from a comparative study by Eskell (1981) of 7 sites on the Lane Cove and Parramatta Rivers. Two were on the Lane Cove - Tambourine Bay and off the south end of Boronia Park. Of the 7 sites, net weights of invertebrates, sampled in February 1978 and 1979, were highest in Tambourine and Hen and Chicken Bays and lowest at Boronia Park and in Iron Cove. Diversity was also highest in Tambourine Bay.

Summary

The Lane Cove River mangroves do contribute organic matter to the estuarine system, they are a nursery for some juvenile fish and they do provide a habitat for birds and invertebrate fauna but the significance of their contribution to each of these must be assessed carefully for this location rather than applying generalisations derived from studies of mangroves in tropical or more marine, less disturbed situations.

While the mangroves above Figtree drop approximately 137t of litter each year, much of this would be mineralised and either leached into the water or recycled by the trees. The remaining detritus from the mangroves may be utilised directly by prawns, the sea mullet and flat-tail mullet, which are all found in the mangrove lined part of the river, or contribute to the food chain. However, in view of the considerable quantities of organic matter entering the river with sewer overflows and from the catchment upstream during storm events, the contribution from the mangroves to estuarine nutrients and food chains may only be significant during particularly long dry summers.

These mangroves are located upsream with fluctuating salinity, decreased habitat diversity, decreased tidal exchange and considerable turbidity after rain and with the activity of powerboats. Thus the diversity and abundance of fish, marine invertebrate fauna and algae populations associated with these mangroves is (or is most likely to be) markedly reduced by comparison with Careel and Botany Bays and even the Harbour or the river below Figtree.

As a nursery or shelter for juvenile fish the mangroves above Figtree, separated from seagrass beds, do not seem to be utilised to the extent they are in less disturbed locations such as Careel Bay and Botany Bay.

As a habitat for other fauna they do not serve any unique function that is not, or could not, be served by adjacent marine or terrestrial habitats. However, considering the scarcity of adjacent terrestrial habitat in some part of the river, the mangroves can assume importance as the only available habitat.

Below Figtree Bridge the ecological value of the small area of mangroves should be regarded in a different light. Here the mangroves are adjacent to seagrasses, supporting high invertebrate populations, and other fish habitat and feeding grounds in an estuarine environment. They also provide habitat for the mangrove specialist, the mangrove heron. On these grounds, the relatively recent destruction of mangroves in Burns Bay is unfortunate.

6.2 Historical and Spatial Perspective

Port Jackson/Parramatta River has never been a region of extensive mangrove growth, as occurs in other parts of the world, essentially because it is a drowned river valley forming a deep water estuary in a temperate zone.

At the time of white settlement, the process of sediment accumulation in the harbour was at a relatively early stage, occurring predominantly on the southern shores of Port Jackson with its lower local relief and the easily eroded nature of the shale parent material. This sediment accumulation was predominantly at the heads of the bays where the various creeks entered the harbour and there were some extensive mudflats in the upper reaches of the harbour. These mudflats (more extensive than they are today due to reclamation and dredging since last century) began at Rhodes Point, Homebush Bay and were referred to by First Fleet writers as 'the flats' but they did not carry mangroves apart from a 'mangrove island' off Wentworth Point in the Parramatta River (not present today).

Clarke and Hannon (1967) summarised some of the reasons for the lack of development of mangroves in Sydney Harbour :

(i) Relatively low sediment yield from the permeable sandstone parent material of much of the area.
(ii) Deepwater close to rocky hills along much of the shoreline, due to the drowned river valley formation, requiring much sediment for filling.
(iii) Small rivers/creeks with low erosion and transport capacity draining small catchment areas from which to derive sediment.
(iv) Relatively small tidal range of 2m affording a small intertidal area available for colonisation.
(v) The flushing and distribution effects on sediment of tidal scour and spasmodic flooding.

To these should be added the relatively low yield of organic matter and nutrients from the catchments and their vegetation. The lack of mangrove development on 'the flats' may have been due to insufficient consolidation or insufficient nutrients or organic matter.

It was only on the bayhead mudflats that mangroves had developed by the time of settlement and not necessarily on all such areas as reed and saltmarsh swamps without a mangrove fringe were also present[2]. The Parramatta River Study (Lynch, Spence and Pearson, 1976) claims that mangroves once extended in a continuous strip for at least 60km[3] up the Parramatta River and into its southwards bays. Much contemporary literature on mangroves and saltmarsh also refers only to saltmarsh developing behind a mangrove fringe while it is often assumed that where bare mudflats exist now, mangroves have been

destroyed.

However, the historical evidence does not support these contentions. The few descriptive comments on the harbour and its branches mention mangroves only infrequently. Rocky slopes covered in woods, swampy ground (not specified as grass, reed or mangroves) and areas which may be suitable for agriculture were noted.

> "As we proceeded up the Harbour.....About 4 mile higher than where the ship lay, the country was open and improved the farther we went up and in most places not any underwood - grass very long."
>
> Lieutenant William Bradley, first survey
> Sydney Harbour, 3rd February, 1788.

Had there been extensive mangrove fringes it is likely they would have deserved comment as they would have restricted the sort of views of the country thus described, as well as restricting potential access and landing sites. Even further up river, on Governor Phillip's expedition to Richmond Hill in April, 1788:

> "....we fell in with an hitherto unperceived branch of Port Jackson harbour, along the bank of which the grass was tolerably rich and succulent, and in height nearly up to the middle, interspersed with a plant much resembling the indigo."
>
> Surgeon John White

This may have been a similar environment to the grassy flats of the middle Lane Cove River at this time. Mangroves were not a problem and are mentioned, in passing, at the heads of bays, in the many small coves of the indented shoreline of the harbour's bays. Thus Bradley, on 4th February, 1788 also describes going "into the sw branch, found it terminate in snug coves, surrounded with mangroves, rather shoal water" (my emphasis).

After a further survey Bradley gave a general description of the harbour including:

> "Those coves above where the ships lay were surrounded by mangroves and had mudflats at the bottom. Those below had sandy beaches most of them."

Whilst this may be interpreted as mangroves lining the harbour west of Sydney Cove, it is more likely, in view of other descriptions with the use of the word "cove" and the comparison to sandy beaches, that it again refers to bayheads. Further evidence of this is an 1828 map[4] of part of the Parramatta River on which there are mudflats in all south shore coves but patches of mangroves only at the heads of the two southeast coves of Hen and Chicken Bay (now filled) and some narrow fringes in the coves at the heads of Yaralla and Majors Bays. A full study of early maps, surveys and plans of the shoreline of the harbour and parramatta River is needed to fully detrermine their shoreline vegetation at the time of settlement and the subsequent changes.

It is quite possible that the original (1788) extent of mangroves in Port Jackson was much less than is commonly supposed with marshes and reed swamps fairly common as low-lying waters edge vegetation. This is certainly the picture which has emerged for the Lane Cove River, where the fine sediment deposition had built up from just above Figtree down towards the mouth and some of these mudflats carried mangroves. The earliest development was as islands, for example, the two which still exist in Cunninghams Reach and those which later developed in the mouths of Stoney Creek and Buffalo Creek. Further upstream, where the sediment accumulation was coarser (from the sandstone of the catchment) and probably contained less organic matter, marshes and reed swamps occupied the low-lying areas on the edge of the river, the degree of salinity determining the species. Some evidence for this pattern of sedimentation comes from the dredger, Davidson, who found clean commercial sand under the relatively shallow mud in the now mangrove lined part of the river downstream from Fullers Bridge. In the vicinity of Figtree, however, the proportion of sand being won to the silt present had declined considerably, so as to be an almost uneconomical proposition for dredging, indicating this area had been one of silt deposition under 'natural'[5] erosion and deposition rates.

With white settlement in Port Jackson, the balance of factors affecting the growth and distribution of shoreline and nearshore vegetation changed. Much larger quantities of sediment began to be deposited quickly with initial land clearing, agriculture and unsealed roads all creating bare land surfaces ripe for erosion. Larger quantities of organic matter and nutrients were also entering the water from clearing and burning, sewerage and even the denser population of animals the colony maintained.

This then rapidly extended the environment ideal for mangrove colonisation - intertidal mudflats rich in organic matter - and the mangroves were able to take full advantage of the opportunities offered until or unless they obstructed progress and development. Heads of bays, whether mangroves, saltmarsh or reed swamps, were eventually filled to create public recreation land or harbour facilities while seagrass beds which may have existed were destroyed by reclamation, too rapid sedimentation or dredging. In

the Lane Cove River, the same factors of change applied with the exception that, while salt-marsh was largely filled or destroyed, mangrove colonisation has proceeded almost unchecked.

The major period of such colonisation was the late 19th and early 20th centuries, growth since then being mainly in height and width and infilling of gaps. Blacker (1977) found a highly significant increase in mangal area in Pittwater, Cowan Creek and Middle Harbour (similar catchments physically to the Lane Cove although the first two were later in settlement history), even from the 1940's, up to 1955-56 associated with the continuing accretion of sediment on tidal flats eroded from either developing urban areas or bushland badly damaged by fires. Allaway (Sydney University, pers. comm.) has found similar increases in Botany Bay. The same significant growth and extension of mangrove areas since white settlement would probably be found in all estuaries along the NSW coast suited to mangrove growth.

Why did the mangroves suddenly explode towards the end of the 19th century. or even later in some areas when mudflats were present much earlier? Probably the key factor limiting mangrove growth prior to, and in the early stages of white settlement, was nutrient levels, especially of phosphorus and nitrogen, and even the extensive mudflats in the upper harbour carried only limited mangrove growth. The implications of the increases in nutrient levels in Sydney bushland is discussed in Ch. 3.1 and these implications should be carried through to shoreline vegetation.

However, little work has been done on the effect of available nutrients on mangrove growth and extension. In Australia most studies cover very limited time periods and tend to concentrate on such growth factors as salinity, period of inundation, drainage and wave energy (Clarke & Hannon 1969, Hopkins 1974) or to look for the destructive effects of man's activities (Hegerl, 1982). Where nutrient and organic fluxes have been examined they tend to concentrate on export from the mangrove system (Boto, 1980) although Boto has commented on the lush growth of Queensland mangroves probably resulting from the nitrogenous fertilisers of nearby sugarcane areas. Hegerl has also pointed out that reduction of nutrient input has been shown to reduce mangrove growth proportionately.

The studies of change in mangal area in the Sydney area cited in this chapter all utilised aerial photographs dating back to 1951 or approximately 1940. As the major destruction of mangroves and reduction in area occurred in the 1950's and 60's with the post-war expansion of Sydney, whilst the extension of area had started much earlier, such studies present an incomplete picture of the effect of white settlement on mangrove area.

This study contends that considerable mangrove extension had occurred even well prior to the 1940's as described in Capter 3.4. To assess this other data sources such as maps, descriptions and ground photos must be utilised. If, however, this hypothesis can be supported by sufficient evidence, the role of mangroves and our attitudes towards them may need some re-evaluation. As well, the ecological concepts of succession in areas of mangrove growth of our temperate zones may need re-examination, that is, the natural or pre-white shoreline vegetation may not have been mangroves stabilising the sediment, succeeded by saltmarsh then melaleuca and/or casuarina swamp. Instead, mangroves may have colonised the outer edges of the other vegetation zones from relatively isolated patches subsequent to white settlement.

A study of changes in mangal area in Port Jackson from 1951 to 1981 (Carol Thorogood, State Fisheries pers. comm.) produced the following data:

	Total ha Pt Jackson	Total ha Lane Cove R.	Total LCR as % Pt Jackson	LCR above Figtree
1951	183	31	17	27.6
1961	156	30	19	-
1970	133	28	21	-
1978	121	26	21.5	23.7
1982	slight. incr.			

Note: Downstream of Figtree Bridge mangroves were found in Tambourine Bay and Burns Bay in 1951. Since then approx 1 ha in Burns Bay has been cleared for recreation areas, leaving only a few scattered trees.

In the 1950's and 60's there was a decrease of 27% in the Port Jackson mangal area existing in 1951. During the 1970's the rate of decrease slowed considerably and in some areas there were even some small increases. Blacker (1977) found the same picture in Pittwater - devastating reclamation after 1961 with a highly significant decrease in mangal area, although Cowan Creek, with relatively little development pressure, has remained relatively stable in total mangal area. However, these decreases were following large increases earlier in the century.

Lane Cove River mangroves represent a significant proportion of Port Jackson mangroves, a proportion which increased as they were lost elsewhere. However, this must be considered within the context of the relative value they may be providing just as the 1951 mangal areas and subsequent losses should be considered in both the longer term historical context and in a wider spatial context where the productivity and fisheries value of mangroves is concerned.

Botany Bay and the Hunter River are topographically more typical estuarine environments, naturally suited to the development of wetlands, than Port Jackson or Broken Bay. For example, Botany Bay mangroves at present cover an area of approximately 400 ha in stands up to 300m wide (SPCC, 1981) in close proximity to seagrass beds and backed by saltmarsh. Hunter River estuary mangroves cover 1548ha - the second largest estuarine area of mangroves in NSW (West et al, 1984). If mangroves are important in fisheries production, these two areas, by their sheer size, must play a far greater role than Port Jackson mangroves; factors of location, pollution, salinity and diversity of habitat aside.

As a deepwater harbour with few seagrass beds and lacking in variety of habitat, Port Jackson did not support high fish populations in 1788. Whilst the fish were sufficiently plentiful to easily support the Aboriginal population, especially in summer, Aborigines were present in very small numbers relative to later settlement. All the First Fleet writers comment on the relative paucity and irregularity of the fish supply in Port Jackson although diversity of fish and the presence of "enormous" sharks were noted by Captain Watkin Tench. Botany Bay was recorded as possibly better in its fish supply. From Tench in July, 1788;

> "Fish, which our sanguine hopes led us to expect in great quantities do not abound. In summer they are tolerably plentiful, but for some months past very few have been taken. Botany Bay in this respect exceeds Port Jackson. The French once caught near two thousand fish in one day, of a species of grouper[6]..."
> (p. 69)

And again, at the end of his stay, in December, 1791:

> "Many a night have I toiled in the public service, from four o'clock in the afternoon, until eight o'clock the next morning, hauling the seine in every part of the harbour of Port Jackson: and after a circuit of many miles, and between twenty and thirty hauls, seldom more than a hundred pounds of fish were taken. However, a glut sometimes enters the harbour....but the universal voice of all professed fishermen is, that they never fished in a country where success was so precarious and uncertain." (p.272)

From Collins in 1788:

> "It had been imagined in England, that some, if not considerable savings of provisions might be made, by the quantity of fish that it was supposed would be taken; but nothing like an equivalent for the ration that was issued to the colony for a single day had ever been brought up.
>
> "It was said that the French ships, while in Botany Bay, had met with one very successful haul of large fish....but this good fortune never attended Governor Phillip's people. Fish enough was sometimes taken to supply about two hundred persons; but the quantity very rarely exceeded this." (p.34)

By contrast with these First Fleet reports, a 1980-82 State Fisheries study (Henry, 1983,) found that current fish catches in the Sydney estuary were 164,654 kg/year by amateur fishing and 108,357 kg/year by commercial fishing - a total of 273,011 kg/year (614,274 lb). Whilst, with the number of fishermen now involved, there is a far greater fishing effort being expended to achieve these catches, there are obviously far greater quantities of fish now available to be caught. It is likely that these increases are due to the greater availability of habitat available with port development (extension of wharves which provide sheltered areas and many food encrusted surfaces) and richer nutrient cycling resulting from the increases in organic matter reaching the estuary. The contribution and importance of the relatively small areas of mangroves in the Sydney estuary to this nutrient cycling and as a nursery for these fish has not yet been examined but is likely to be far less significant than the demonstrated contribution of large mangrove areas in tropical regions.

6.3 Human Perspectives

The human perspective on mangroves along the river can be considered from two viewpoints: aesthetics and the humanmangrove interaction - as mangroves affect human use of the river and its foreshores and how waterway/foreshore use may affect the mangroves.

Aesthetics

Mangroves now line the waterway on both banks from Figtree to Fullers Bridge apart from some small breaks, for example, at Sugarloaf Point (where dredging plant operated until approximately 10 years ago), at the cornflour mills and a few spots where rocky cliffs dip steeply into the water (see Map 2 for their present distribution).

To some, the tall, dense deep green of the mangroves lining the waterway contributes significantly to the 'naturalness' and peaceful feel of the waterway and the valley, particularly at high tide when the roots are hidden and the leaves sweep down to touch the water. To others, the high mangroves put a monotonous straightjacket on the river, restricting views of the water and the bushland while revealing a mass of mud and roots at low tide.

Whilst the appeal of the avenue of mangroves is purely a matter of personal opinion, there is no doubt that they do significantly restrict views through to the water from nearby bushland walks and they have generally cut off many fine views which once existed up and down the river.

From the water, the variety of scenery which once existed (see Chs. 1 and 3) has also disappeared. Along many sections of the river cliff lines and rock ledges behind the mangroves identify where cliffs and dry sclerophyll vegetation once met the waters edge. In other areas photos and maps indicate grassy flats, saltmarsh, feathery casuarinas and white-trunked paperbarks along the waters edge. In this context the contrast of the deep green patches of mangroves was enjoyed for its contribution to the variety of scenery (Plummer, Vol. 49). By implication, there was also a greater variety of ecosystems and habitats along the waters edge.

Use of the Waterway and its Foreshores

Whilst the mangroves do provide useful areas for educational fieldwork on wetlands, they also restict access to the waters edge for recreational and contemplative purposes. The recreational uses of the river, over 50 years from the 1880's to the 1930's, of boating trips with picnics along the shores are not possible in the same way due to the coating of the shoreline by high mangrove growth. While boating and picnics up the river are still possible with access via jetties projecting through the mangroves, waters edge and water views have very high value for passive recreation. Picnic areas only behind a screen of mangroves would be considerably less attractive for many people.

The options for, value and potential of, the river and its foreshores are further discussed in Chapter 10.

Human impact on mangroves in the river has been largely beneficial, as previously discussed, by inadvertently creating optimum conditions for growth. Adverse impacts have been destruction through dredging of the river or filling (for tips, playing fields). Small sections of a few trees may also have been destroyed for service access such as laying electicity cables across the river (eg. Sugarloaf to Blackman Park).

Possible future threats to larger sections of mangroves along the river involve mainly construction of roads. A northern link road from the Lane Cove West industrial area to Epping Road may be constructed across the mouth of Stringybark Creek involving 6m of fill over mangroves (see further discussion in Ch. 11). The proposed Lane Cove Valley Expressway would affect considerable sections of mangroves along the western shore. In addition, if the wash from speedboats became severe enough to undercut the root mat, dieback could occur.

6.4 Conclusions

The extent of mangroves between Fullers and Figtree Bridges is not 'natural' in the sense of predating white settlement. They represent an invasion by an opportunistic plant species for whom man created ideal conditions for territorial expansion with the rapid development of intertidal mudflats rich in organic matter/nutrients. Historical evidence indicates mangroves were also no well developed in the Parramatta River 200 years ago and it is likely that the picture of nutrient and silt promoted extension in mangal area over the period of white settlement applies to many of the estuaries of the NSW coast.

Yet, there is a frequent general assumption that the environment that we have today is in all ways degraded from its pre-white state and that what we have today is much less than its former state. While this may be true of many aspects of the environment, white settlement, with its input of nutrients into Australian ecosystems, has favoured the expansion of some species, plant and animal.

Relatively small areas of mangroves have been 'lost' in the Lane Cove River (145 of that existing in 1951). Prior to these losses there had been a massive extension in

their area (probably only 10-15% of the mangal area existing in 1951 was present in 1788). Where losses do occur today, recolonisation is rapid (Photos 15 and 16). However, major losses in area since 1788 have been suffered by the variety of saltmarsh and grass swamp communities. Some of these losses have been due to filling but large areas have been lost to colonisation by the mangroves.

Nevertheless, the mangroves do now exist as a major part of the shoreline communities of the middle Lane Cove River and the functions they now serve should be assessed in that context:

1. A quite limited role in productivity, as a nursery for fish and habitat for fauna.
2. As a trap for the large quantities of sediment which enter the river during flood events. It is arguable whether this is advantageous as this keeps the sediment in the river, widening the mangrove belts, rather than flushing it through.
3. Where the banks are soft, acting as a buffer, protecting them from erosion during storm events or by the wash from boats using the river.
4. As water purifiers in sopping up and trapping as biomass some of the large volume of nutrients, chemicall and metallic wastes entering the river via stormwater and sewerage.
5. Their aesthetic appeal to at least part of the population.
6. For educational fieldwork.

However, few of these values or roles are better served by a continuous fringe, which obstructs most other uses of that vital waterfront area, than by existing mainly in large patches. The major biological reason for maintenance of maximum edge (ie. the continuous fringe) would be if prawns do mainly feed at the edge of mangroves, then perhaps the longer the edge, the greater the prawn populations. Large patches, with channels and ponds, are more likely to better serve as fish habitat/nursery, will be more productive (due to greater area) and also act as better habitat for terrestrial and bird fauna by reducing perimeter effects. Further, it is the mangroves <u>below</u> Figtree Bridge which are most likely to serve the biological functions attributed to mangroves.

While the mangroves impart a unique quality to this part of the river, the relatively low priority need for a continuous mangrove belt so far up this river to serve physical and biological purposes must be set against the high value and potential of this section of river, in an urban situation, for recreational uses in a natural setting and the consequent need for some mangrove-free shoreline. In addition, the educational, scientific, aesthetic and biological value of re-creating some of the former shoreline communities must be considered.

Notes and References

1. It is generally assumed that this is 'natural' ie. pre-dated white settlement. This thesis questions that assumption particularly regarding the nature of the shoreline fringe.

2. The rushes of Rushcutters Bay are particularly well known but rushes were widely used in the early colony eg. for thatching roofs. Two convicts were killed while cutting rushes <u>up</u> the harbour (in the "S.W. arm") from Sydney Cove in May, 1788 as recorded by Captain John Hunter. This has been commonly supposed to have been at Rushcutters Bay but it is unlikely that a naval man would use "up" if he was referring to an area downstream.

3. Presumably this is a shoreline distance or a misprint meaning 6km.

4. Part of the Parramatta River showing the proposed situations for a punt near Kissing Point. T.L. Mitchell, Surveyor General, Dec. 1828, AO Map 3221. A very similar map by Darcy, AO Map 3222, shows the same extent of mangroves but they are more clearly drawn.

5. Not necessarily 'natural' if the effect aborigines may have been having is taken into account - see Ch.5.

6. Apparently schnapper.

CHAPTER 7

RECREATION AND A PARK FOR THE VALLEY

The purpose of this chapter is to examine the historical development of recreation and a unified park concept for this river valley - its origins, the visions which inspired the Lane Cove National Park and what happened to those visions over the years through to the present. Possibilities for the future are taken up in Chapter 11.

The extension of the steam ferry to Figtree in 1884 opened the possibility of recreation on the upper river. In the 1880's a small boat took passengers on excursions to upper Lane Cove from Figtree (Russell, 1970) and for the next 50 years boating, camping and picnic trips by ferry, launch or rowboat up the Lane Cove were very popular recreational pastimes, particularly for the less well-off. Trips often involved boating or rowing right up the river as far as Fiddens Wharf, stopping for a picnic or refreshments on the way, or to the head of navigation, to swim in the Blue Hole at the foot of De Burgh's Bridge or walk through the bush to see (and pick) the wildflowers. Bruce Kinnimont, who ran a boat hire service from Figtree, claims he could deduce, on their return, where picnickers had been by the flowers they had picked.

There were many picnic grounds in the stretch from Fairyland to Fiddens Wharf as along this section there were alluvial flats and established orchards which began a profitable sideline providing refreshment for the trippers.

At Figtree, the end of the regular steam ferry run, were the well known Avenue Gardens (on the site of Hunters Hill High School and playing fields). When the upper river ferry service began in 1908 its wharves (shown on Map 10[1]) were established on, or in the vicinity of small reserves which were cleared and sheltered spots for picnicers and campers. The main picnic grounds (Map 10) up to Fullers Bridge were "The Rest", which started to become known as "Fairyland" about 1909[2], "Judy's Arm" a little further upstream, described in 1908-9 as a "once popular but now old out of date picnic ground" (Plummer, Vol. 49). Opposite Frankston wharf was "the 'Quince Trees' or 'Baby Farm', a wellknown spot to boating parties and a favourite picnic ground having a fine grassed lawn" (Plummer, Vol. 49). Fairyland continued as a popular picnic spot and, later, as pleasure grounds until the late 1960's.

The relatively unspoilt beauty of the river, its popularity for recreation and its proximity to the city and centres of population on the north shore, inevitably inspired more grand schemes for the river and its surrounds. In 1924 renewed agitation for a weir to impound sufficient water to create permanent high tide in association with securing the waterfront land for recreation purposes was led by Alderman A.E. Rudder of North Sydney Council. In an impassioned plea (**Evening News**, 30.10.24) for the reservation of this area of "almost unsurpassed beauty", so close to the city, he suggested Mowbray Bridge (the footbridge) as the location for the weir with dredging from Figtree Bridge to this point. Several other sites were also suggested at this time including one just upstream from Fairyland where a rock shelf projecting halfway across the river would provide solid foundations.

This agitation became a self-styled 'movement' for the reservation and beautification of the foreshores and adjacent bushland of the Upper Lane Cove River (ie. above Figtree).[3] With the river's long association with recreation there was widespread support in the community, press and from local and state governments and events moved quickly at first. In January, 1925 a conference of governmental and municipal representatives[4] resolved "that the Attorney General be requested to immediately place before the Ministry the desirability of at once resuming the whole of the alienated frontages to the Lane Cove River from 'Fairyland' upwards" and to arrange an official inspection.

This took place on 2nd February and the Minister for Works, R.T. Ball, the President of the Sydney Harbiour Trust, Engineer-in-Chief for Water and Sewage, and professional officers from the Departments of Works, Lands, Health and Valuer-General, as well as most of the earlier conference delegates attended. The Minister for Works expressed enthusiasm and support, agreeing to the immediate appointment of a committee of leading government officials and a representative from each of the six councils concerned to prepare a comprehensive report on the proposals. He would also request the Minister for Lands to dedicate all relevant existing Crown Lands to the Councils.

Thus the Upper Lane Cove Beautification Scheme was born and the first Committee meeting was held on 13th February, 1925. This meeting made some far-sighted decisions on

the scope of the scheme which were to be officially reiterated on many occasions in the following 15 years but which then gradually disappeared from both public and official perceptions of the park. Whilst this represents the first formal Committee statement of aims and scope of such a scheme, it encapsulates aspirations which had been put forth since the first weir scheme of 1900. The meeting resolved that:

1. "The whole of the alienated foreshores of the waterway of the Lane Cove River, including, as far as practicable, all contiguous creeks, valleys, ravines and gorges lying generally between Figtree Bridge and to some distance above De Burgh's Bridge, should be mapped out for anticipated resumption."
2. "The area so mapped out should be on a sufficiently comprehensive scale to reasonably ensure the protection of the waterway against encroachment or pollution and the retention of all the natural features of the valley for the purpose of an extensive National Park, also having in view the ultimate object of damming the river at suitable positions".

Councils were also asked to draw up maps of proposed areas for resumptions and reservation with acreages and values, and investigations for the proposed weirs were initiated.

Preliminary surveys were completed in March. The Department of Lands inspection report[5] indicates 890 acres (340 in existing reserves, 550 in freehold) "will reasonably meet the requirements of the original decision, points 1 & 2" (as above) from Figtree Bridge to old Thornleigh Road. This included the entire foreshores, adjacent land which is too steep and rocky for anything else and additional areas "desirable in the interest of the proposal". However, the Mayor of Ryde and President of Ku-ring-gai Shire indicated the desirability of including other areas of land and a Ku-ring-gai President's Minute of 17th March, 1925 mentions a figure of 2,000 acres identified for the park in a preliminary survey. 2,000 acres is the figure which is subsequently mentioned over the years as constituting the desirable scope of the scheme. The initial estimate of the cost of this scheme was £25,000.

C. Bowes-Thistlethwayte, then President of Ku-ring-gai Shire, managing Trustee of the Moore Estate and great supporter of the Scheme, started the ball rolling with a declaration at the February, 1925 inspection that the Estate would donate a depth of 100' along 1 1/4 miles of the river (125-150 acres) for inclusion in the reserve.

That year the Minister for lands, W.E. Wearne, also reserved all Crown Lands contiguous to the Lane Cove River from sale but the pace of action then slowed considerably. From 1925-29 surveys were made and negotiations took place between councils, government departments and landowners.

The Committee was formally constituted by the Minister for Lands in 1929 and consisted of representatives from Ryde, Willoughby, Hornsby and Ku-ring-gai Councils, the Departments of Lands and Valuer-General and the Sydney Harbour Trust with A.E. Rudder as Chairman. It was to put into effect what was now called the 'Lane Cove National Park Scheme" and was particularly to advise on land acquisitions between Fullers Bridge and De Burgh's Bridge as the original proposals had been modified to a short term goal which could be financed.

The land was acquired by the Lands Department with the State Government and the Sydney Harbour Trust accepting liability for two thirds of the cost of resumptions and Ku-ring-gai and Ryde Councils meeting the remaining third of the cost of acquiring the privately owned lands at a ratio of Ku-ring-gai 2: Ryde 1. At this time reserves already existing were far greater on the Ryde side (a carry-over from the Field of Mars Common) than on the Ku-ring-gai side. According to one report (**S.M.H.**, 30.1.25), there were 27 acres in reserves on the north (east) side, 120 acres on the south (west) side and 30 acres of unreserved Crown land. To resume a depth of 10 chains (200m) on either side of the river from Fullers Bridge to De Burgh's bridge necessitated taking about 190 acres on the north side and 58 acres on the south at an estimated cost of £14-15,000.

However, in arriving at the financing ratios the United Australia Party (UAP) - Country Party government at the time allowed an upper limit total of only 7,000. Any cost above this would have to be met in full by the councils. Throughout this vital period of establishment of the park, the late 1920's and the 1930's, Country Party interests dominated government expenditure resulting in a quite astonishing direction of government spending to country areas. City projects, be they roads, railways or parks, suffered accordingly.

By modifying the proposals to initially include only Fullers Bridge to De Burgh's Bridge, by council resumption and careful open space allocations from subdivisions over the years and dedications by private owners, the cost of acquisition was held down. By 1936, for this section of the park to open in 1938, it was only £5,000. However, modification of the proposals meant confining it to a 'greenway' type of park ie. a band

of reserved land along the river for foreshore recreation, picnics etc. The prime purpose of the depth of reserved land back from the foreshores seems to have been as a buffer against pollution of the river of which most people involved with the scheme were very conscious. Under the obvious financial constraints it was difficult for those who attached importance to the reservation of other adjacent bushland and tributary valleys, to have them included in the scheme.

Apart from financial contributions to the establishment, and later running[6], of the park, local councils were also to eventually transfer trusteeship of appropriate portions of their Crown Land reserves to the Park when the necessary amendment was made to the Local Government Act (enacted in 1945). As a locally initiated movement led, and largely effected by, aldermen from local councils, the setting up of the Park was seen as a local project under local control providing local benefit, merely requiring State government approval and technical and financial support. Thus there seems to have been much co-operation and goodwill involved in these founding stages. The co-operation and goodwill have not disappeared but relationships have inevitably undergone change over the years with the setting up of an independant body (the Trust) to manage the park, and as population pressure and the demand for land increased.

The first meeting of the Lane Cove National Park Scheme Committee was in June, 1929 but it only remained active until February, 1930. By this time much of the land had been acquired but the Depression put further plans for such recreation facilities on ice. In 1935 the Committee expressed a desire to renew its activities and was reconstituted by the Minister for Lands in June, 1936 with C. Bowes-Thistlethwayte taking over from A.E. Rudder as Chairman and reporting that all areas desired by the Committee from Fullers to De Burgh's Bridge, with some exceptions, had been secured. The councils, particularly Ku-ring-gai and Ryde, had quietly continued to negotiate and acquire land for the park during the depression years - but now the pace of development again speeded up.

In 1937 the Department of Public Works commenced the construction works in the park as an unemployment relief project (the weir, Riverside Drive and other stonework) sufficient of these being completed by October, 1938 for the park to be opened to the public, although work went on until 1940.

The site eventually selected for the weir after much investigation was seen as the most satisfactory for several reasons. It would flood the minimum area of lowlying lands and valuable river flats. Weir sites below this point would affect both land purchased for the park and private owners (thus requiring compensation). Secondly, it allowed sufficient height above tidal influence and depth of the lake to minimise pollution above the weir. It was also the most accessible site for construction purposes. The actual construction of the weir has never been satisfactory as it leaked as early as 1940 and its problems have proved difficult to rectify.

To open the park a managing body had to be formed. The original proposal, discussed and approved by the Committee, the Treasurer and the Minister for Lands in 1928, was the formation of a District County Council under Part 29 of the Local Government Act, with delegation of powers from the councils concerned, for this specific purpose.

However, in 1936, when initial efforts to obtain the necessary capital works for the park through unemployment relief proved abortive, as the Public Works Department was confining such expenditure to park lands vested in the Crown and controlled by government appointed trusts, the question of eventual management arose again. All the Committee agreed that the lands acquired by the Crown and the councils required unified development with central control but, should:

a) the land be acquired by the government at the instance of the Committee be vested in the various councils and controlled by them in conjunction with such contiguous areas already vested in the Crown

or

b) the councils' lands be vested in the Crown to be controlled by a trust in conjunction with areas already vested in the Crown?

The councils were all in favour of a trust and also agreed at this stage, or a little later, to transfer various lands to the Trust.

In October, 1936 a report from the Chairman of the Committee to the Minister for Lands once again spelt out the envisaged area and nature of the scheme. Its scope was "always regarded" as encompassing the foreshores of the river and the bushland of the valley from Figtree to Wahroonga in an area of approx. 2,000 acres. Development would involve:

a) lower section - tidal foreshores from Figtree to the proposed weir - considerable dredging for access to the rest of the park and reclamation of mudflats to create playing fields and picnic grounds.

b) middle section - depended on the construction of the weir to create a permanent high

tide 'lake'.

c) upper section - above De Burgh's Bridge - rugged but, with residential expansion "will be capable of development by construction of additional weirs and improved access".

Obviously, the picnic grounds model of recreation was the prevalent ethos and the park scheme represented a formalisation and extension of the type of recreation taking place on and along the river over the previous 50 years.

However, the limited finances made available by the government were significantly hampering the 'grand vision' and the most significant effect, for the future, was their inability to make land acquisitions beyond the immediate central area prior to the opening of the park. Once opened, the Trust was appointed to manage only the land under its control, not to seek additions to that area. Meanwhile, the theme of the extended scope of the park was pointed out on numerous occasions in letters to Ministers on the question of finances and on official inspections of the river.

The areas included under the first Trust's control were those portions already vested in the Crown, which were readily accessible to the public and therefore needed to be placed under adequate control and supervision ie. those areas situated between De Burgh's and Fullers Bridges - about 300 acres. This did not include the various lands under council trusteeship and control which they had agreed to transfer to the park, as the enabling amendment was not passed until 1945. The first Trust was composed of 4 permanent trustees and an alderman from each of Ku-ring-gai, Willoughby and Ryde Councils. This was later increased to 7 permanent trustees and representatives from Lane Cove and Hunters Hill Councils. The latter have now been withdrawn from the Trust again on the grounds that, as the State Recreation Area does not extend to areas within , or adjacent to, these municipalities, their representation is not appropriate. This reflects the changing nature of the Park, both in its physical extent and its perceived scope, particularly with respect to areas downstream.

As the Trust was required to be concerned only with the management of lands under its control, at the Committee meeting of 29th August, 1938, it was resolved that the Committee should continue to act to acquire land in all three sections of the desired park. Below Fullers Bridge this was specified as all foreshores, as far as practicable, in Willoughby and Lane Cove as far as Burns Bay and from Boronia Park to Fullers Bridge in Ryde Municipality. The Committee was reconstituted in February, 1939 and began by reaffirming the original aims of the movement which dated back to 1900 ie. the preservation of the whole of the foreshores of the Lane Cove River upstream from Figtree Bridge. They saw their role as endeavouring to ensure further acquisitions were made towards this end.

However, from this time their efforts to realise this ambition met with varying success. In general, efforts to secure land in the central and upper sections were reasonably successful and considerable areas were added to the Park, especially in the vicinity of, and above, De Burgh's Bridge, as well as some small but key areas near Fullers Bridge.

From the 1940's, except for a few visionaries, perception of the total park stopped around Fullers Bridge. The Trust was preoccupied with the business of running the new Park with very limited finances and with problems of kiosks, boatsheds and water supply. Downstream was a problem due to pollution, siltation, flooding and unsightly mudflats and it was hard to convince Ministers to allocate money for resumptions and acquisitions when confronted by the state of the river. The dredging of this part of the river, which solved some of these problems, started in the late 1950's - too late. Opportunities, and perhaps even the concept, had been lost. It wasn't until the late 1970's when the lower river began to recover from the scars of dredging and was cleaned up by pollution controls that its potential once again became obvious.

Nevertheless, the reconstituted Committee tried for some years and the concept of the continuation of the Park below Fullers Bridge occasionally surfaced in some acquisitions and was partly recognised by Cumberland County Council (CCC) planning. Yet, without the sort of drive, finance and and local co-operation which founded the main Park, the result has been an odd and confused patchwork of land ownership between Figtree and Fullers Bridge, difficult to rationalise today even given great goodwill between all the parties involved (see also discussion in Ch. 11).

There were successes and failures for the Park. For example, as early as 1938, the original Committee was concerned by the spoliation of both banks of the river below Fullers Bridge by soil removal, the worst affected area being the flats on the Chatswood side above Clifford Love's cornflour mills (then part of the Whatmore Estate, now the Athletics Field). It was decided to take prompt action to secure these foreshores but no acquisitions were able to be made at this stage. Whilst similarly affected foreshore areas closer to Fullers Bridge around River Avenue have been gradually acquired for the Park over the years, especially since zoning for that purpose by the CCC, the Whatmore

property was acquired by the CCC and handed over to Willoughby under deed of trust in the 1950's despite the Park Trust's expectations that it would be added to the Park. "Parish pump" politics was one of the greatest problems of the CCC and the Trust had no direct representation. Willoughby Council has generally been supportive of the Park except, naturally, where a direct conflict of interest has arisen. Willoughby seems to have made sure that it gained, or retained, control of all the river flats in its municipality below Fullers Bridge - it was quite happy for the Park to be given the sandstone cliff country.

In 1939, the Committee recommended the acquisition of two blocks of river frontage near Boronia Park, Hunters Hill on Bonnefin Road in order to further extend foreshore reservations towards Figtree Bridge. Hunters Hill Council agreed to contribute half the cost but this, also, was not acquired and the water frontage between the river and Bonnefin Road is all privately owned residential land although it does carry a 15m building line for visual protection.

Inadequate finances for both acquisition and management and interruptions to the impetus to set up the park (the depression) and to expand it (World War II), together with the varied perceptions of the Park held by the various Trustees, by local councils and state governments and their Ministers for Lands, have created problems and ambivalent attitudes towards the scope of the Park ever since.

Had the considerable areas of land then available below Fullers Bridge been acquired for, and melded into, the park between 1925 and the late 1940's (land which was then relatively cheap due to the lack of access, distance from public transport and its topography), the original concept could have been realised - a 'fait accompli' prior to CCC planning. There was little development in the valley up to this time but, from the late 1940's and the County of Cumberland Planning Scheme, the pace of development altered. To satisfy CCC requirements for an industrial zone in each municipality, Lane Cove zoned the unwanted land in Lane Cove West (with prime river views) for industry. The freeway planners put a major freeway reservation down most of the valley from Epping Road to Figtree Bridge (originally in the east but later moved into the open space on the western shores). Residential development gradually crept in towards the river, the Electricity Commission used the valley as a service corridor for high voltage transmission lines and substations and the growing population demanded both waste disposal and active recreation areas. The competition for land along the river below Fullers Bridge grew rapidly.

From the 1950's, the Trust, struggling to keep afloat in the main Park, knew little about the areas downstream - either what areas they actually controlled (acquisition was now handled by the Lands Department on the instigation of the CCC) nor what to do with them as isolated blocks. Areas were acquired, some were swapped back and forth between the Trust, the planning agencies and the local councils with no overall concept or plan and no clear goals, although various attempts were made to establish these.

The 1948 CCC Planning Scheme had designated most of the immediate valley downstream of Fullers Bridge as open space - part of its 'green web' throughout the city for recreation purposes and to help establish the identity of districts. The extension of reservations along the Lane Cove River were "to give complete protection to this natural playground and make a clear break between the residential development along the Lindfield-Pymble line to Hornsby and the Gladesville-Ryde-Epping line farther west" (Winston, 1957).

Essentially this echoed the long standing whole valley park concepts but, as happened with so many aspects of CCC planning, the concept was easily eroded by developmental and political pressure. Thus the coherence of this open space has failed to be established. A large section was taken by the relocation of the freeway reservation (see Ch. 9), the transmission lines and substations intruded and local councils were unwilling to cede any further land to the Trust. They either required it for their own purposes of rubbish disposal and active recreation provision or simply preferred to retain control over land within their municipalities.

In 1959 the National Parks Association proposed enlargement of Lane Cove National Park by consolidation of existing reserves from Fullers Bridge to the source and inclusion of other areas zoned open space or green belt on the CCC plan - from Swaines Creek on the east bank and Fairyland on the west bank to Pennant Hills Park. The CCC considered the proposal "meritorious" and convened a conference with the Trust in April, 1960, the results of which went considerably further downstream than the NPA proposal.

Negotiations and discussions, particularly with the councils, proceeded until 1965 when the, by then, State Planning Authority (SPA) advised councils that views from all of them had been received but it had been decided to defer decision pending the new National Parks and Wildlife legislation. The Park was not created a National Park under the National Parks and Wildlife Act, 1967 due to its small size and the degree of development and disturbance. It was then renamed the Lane Cove River Park until its inclusion in the State Recreation Areas system.

In mid 1967 the Trust was finally informed that the SPA had decided that the most effective way of resolving the question of future extensions was in the local planning schemes prepared by adjoining councils. An indication of the mood of the councils at the time can be gauged from a Trust summary of correspondence of 1966-67, pertaining to the matter, in Appendix VII.

In a report to Council of 15.6.67, Willoughby's Engineer and Town Planner commented:

"We cannot see how Local Planning Schemes have anything to do with extensions to the Park. It appears the SPA has now abandoned its investigations into a solution whereby areas of the park could be extended into adjacent lands. This in particular applied to other Council areas."

By 1974, some lands had been acquired directly for the park but the areas held fell far short of being able to extend a continuous park boundary even partway towards Figtree Bridge. Thus the 1974 conference to decide the boundaries to be notified as the Lane Cove River State Recreation Area (SRA) decided to exclude almost all blocks held south of Fullers Bridge because they were either too fragmented and isolated from the park proper, or were being managed with adjacent council reserves. Only the River Avenue blocks and parts of Fairyland, which had been acquired and were part of a larger area relatively contiguous with the main park proposed for addition, were included. The excluded areas remained Crown reserves under a separately constituted Trust, whose members were mainly also Trustees of the SRA.

The concept of the whole valley park was revived in 1981 by MSJ Keyes Young who prepared a Draft Plan of Management for the Lane Cove River SRA which included consideration of all the natural areas of the Lane Cove Valley, both in the upper catchment above the park, and from Fullers Bridge down to Figtree. This draft recognised the importance of the whole valley as an easily accessible day-trip recreation resource for metropolitan Sydney and that, in planning management, one section should not be taken in isolation. However, their first draft was rejected by the Minister for Planning and Environment, ironically because a State Recreation Area plan of management cannot consider areas not legally constituted within that SRA. The published draft thus confined its attention to the SRA although traces of the original proposals could still be found. The final Plan of Management (NPWS, 1983) draws attention to the need for whole valley planning in the form of a regional plan and points out that a submission has been made to the Department of Environment and Planning (DEP) requesting such a plan.

The Present Situation

At present, inclusion of the foreshores south of Fullers Bridge under unified management, or management policy for public recreation seems as far away as ever. Even where land is not privately owned, multiple authority and government ownership with as many different perceptions of the role and value of the various sections of the valley, makes a co-ordinated approach very difficult. Below Fullers Bridge, the lands division of the DEP is currently attempting to rationalise the land ownership as it controls a considerable amount of land on the Ryde side between Fairyland (Portion 384) and Kitty's Creek. However, in the absence of a regional plan for the valley with overall concepts set and agreed to on a community basis, the chaotic land ownership and present or proposed land uses cannot be resolved satisfactorily.

By 1983, with a professional park manager and greater funds available for development and improvement, the management of the SRA also developed a perception of the park extending beyond Fullers Bridge. Whilst all the foreshore land from Fullers Bridge to Epping Road is zoned for open space and much of the land on the northwest bank is being secured for the park, the southeast bank is a jumble of ownerships and/or controls with Crown reserves, land acquired for the park, Willoughby Council reserves and the complication of leases over some of these reserves. The key loss in this section was the Whatmore property which was cut and filled to become the Athletic Field.

Below Epping Road, the picture is even more confused with a much greater degree of encroachment by settlement and industry, particularly on the east bank, and alteration and disturbance, especially by filling. Consequently the possibility of the unified park extending downstream beyond Epping Road presents considerable difficulties.

Extension of the park downstream from Fullers Bridge into areas apart from those currently in process (northwest bank to Epping Road), and planned since the CCC plan, is likely to meet opposition from a number of quarters. Apart from the interests of Councils in retaining control over their reserves and of government departments/authorities, notably the Maritime Services Board who control the waterway to high tide mark, the Department of Main Roads with their freeway reservation and the Electricity Commission with plans for upgrading their installations[7], there are a number of local conservation groups with considerable proprietory interests in various parcels of bushland along the

valley.

These groups, especially the Mowbray Park Association, Lane Cove Bushland and Conservation Society (interest in all bushland in Lane Cove Municipality) and Ryde-Hunters Hill Flora and Fauna Preservation Society (particular interest in the Field of Mars Reserve) would bitterly oppose any authoritarian encroachment and takeover by what would be seen as a state government department of their pieces of local bushland in some of which they have invested many hours in clean-up, weeding and regeneration. These groups have conducted well organised campaigns in the past and they would probably receive support from WEPA and the Fullers Bridge Association. Support would undoubtedly come from the Union of Lane Cove Valley Conservationists, an umbrella group of long standing which has since 1981-82 been revitalised and pushed forward under the guidance of some committed 'bushies' from groups in the upper catchment.

Ryde Hunters Hill FF&PS would particularly like to add Sugarloaf, one of the few pieces of land in this stretch of river held as Crown reserve for the Park, to the Field of Mars Reserve. With their Plan of Management and uses strongly directed towards educational fieldwork and, in the absence of any other overall plan for the valley, they have a strong case. However, regeneration work on Sugarloaf's foreshores in early 1985 by the newly revived River Park Trust (managing the areas acquired for the Park but not included in the SRA), as well as the SRA's expanded vision of the Park, makes such a transfer less likely.

All the groups are particularly concerned with the management of bushland, whatever the controlling body, and, as one of their first actions, the reorganised Union of Lane Cove Valley Conservationists submitted to the DEP early in 1983 a proposed State Environmental Planning Policy document for the management and development of all bushland in the Lane Cove Valley catchment.

Some local groups, on the other hand, have expended considerable efforts in working on, or with, their local councils to achieve satisfactory management of their reserves. They are not confident of the SRA Trust's ability to adequately manage for conservation values, having noted its actions in the past eg. the filling of the River Avenue frontage as recently as 1972, permitting other forms of filling on foreshore lands including municipal garbage disposal and entertaining a proposal for a private bird park on SRA land. They also probably feel less able to influence the Trust than their local Council.

While the DEP now considers whether it would be appropriate to draw up a regional environmental plan for the Lane Cove Valley and what priority it should be assigned and other government departments sit on their status quo, some local interests are once again pushing for action. The conservation groups want guaranteed protection for their bushland areas via mandatory management policies while the SRA once again looks towards expansion and the original concepts of the preservation movement whose origins go back to 1900.

However, any attempt to achieve co-ordinated of unified management of the river foreshores and adjacent bushland south of Fullers Bridge must be undertaken with real, not token, involvement of local interests. Local councils and conservation groups must be consulted early in the process but, on the other hand, there are dangers in allowing these vocal groups to dominate decisions on the uses of the foreshores, in particular, at the expense of the rest of the community.

There are two major types of lobby groups pressing councils over the use of open space - the sporting clubs and associations and the conservation groups. The effect of conservation group influence is notable in Lane Cove, where successful political campaigning in the early 1970's, and since, has created and generally maintained a Council sympathetic to the values and bushland policies of the Lane Cove Bushland and Conservation Society. Sporting group pressure, on the other hand, went very close to having one of the few remaining grass swamps on the river filled in the early 1970's (in Mowbray Park - see Ch. 4.6). Buffalo Creek tip was also almost developed as another playing field but will now be developed for a variety of recreational uses including picnicking.

In most areas, due to the influence of such organised groups and/or the will and imagination to develop other possibilities, open space becomes either dreary, single purpose playing fields or bushland maintained only with minimal tracks, used by relatively small numbers of people. The needs of the rest of the community (who neither play team sports nor bushwalk) are largely unexpressed and therefore usually ignored. The value of the resource under study to the rest of the community is examined in Chapters 10 and 11.

Notes and References

1. The names and locations of the wharves on Map 10 conflict to some extent with those shown on a similar map p.140 Russell (1970). Information for Map 10 has been drawn from a number of contemporary accounts in Plummer, Vol. 49 and from a 1909 Sydney Harbour Trust hydrographic survey map. These locations would appear more consistent with other known facts about the river, particularly as there are other inaccuracies, currently verifiable, in the Russell map eg. the location of the Chicago Flour mills and the Fairyland Picnic Grounds.

2. Pratt (1980) claims 1914 but newspaper cuttings collected in 1909-10 (Plummer, Vol. 49) use both "The Rest" and "Fairyland".

3. Sources for the history of the setting up of the Lane Cove National Park and its subsequent history were the Minutes of the Committee to establish the Lane Cove National Park and of the Lane Cove National Park Trust, the Bowes-Thistlethwayte Collection in the Local History Section of Ku-ring-gai Municipal Library and Kuring-gai Munipal Council files - 'Lane Cove River Park' 1 & 2. Some additional material was also derived from Willoughby Municipal Council files held in the Local History Section of Willoughby Municipal Library.

4. These included local MLA's, the Metropolitan Health Officer, representatives of 6 local Councils (Municipalities of Ryde, Hunters Hill, Lane Cove Willoughby and Eastwood and the Shire of Ku-ring-gai), the Town Planning Association Of NSW, the Sydney Regional Plan Convention, the Sydney Harbour Trust, the Department of Works and the North Ryde Progress Association.

5. From A.G. Close, Staff Surveyor Report 11.3.25. Copy in Ku-ring-gai Council Lane Cover River Park File 1.

6. £500 ($1000) per year from 1963 from four councils - Ryde, Ku-ring-gai and Lane Cove.

7. The MWS&DB has only small portions of land surrounding, and giving access to, key points along its sewers and the NOOS overflow - plans for upgrading NOOS do not involve this part of the Lane Cove Valley.

CHAPTER 8

THE PROCESS OF ALIENATION OF PUBLIC RESERVES - AN EXAMPLE

During the past 10 - 15 years there has been increasing concern from conservation groups, resident action groups and individuals over the provision and availability of urban open space. Increases in population and decreases in de facto open space (ie. undeveloped land) have created a greater need for reserved public open space at the same time as competition for land has increased. Thus conflict arises.

One aspect of this conflict has been battles to preserve for public use open space already reserved for public recreation but threatened with alienation either by lease to private interests or by the building of facilities such as parking areas and boat ramps. Of these two categories, the second is less clearly 'wrong' as it can be argued that the proposed facilities are for general public use and thereby entitled to public land. However, the lease of sections of parkland to sectional private interests for exclusive use, and often for private profit, is more generally recognised as deplorable. These most commonly take the form of leases to sporting clubs such as bowling and golf clubs for the sporting facility itself and to football and other clubs for clubhouses (councils already providing the ovals as part of their active open space provision).

The land so leased may be council held land dedicated as public reserves or Crown lands reserved for "public purposes", such as recreation, under the Crown Lands Consolidation Act, 1913 and the Crown Lands and Other Acts (Reserves) Amendments Act, 1974 and vested in trustees for care, control and management. Apart from State Recreation Areas, these trustees are most often the local council. Thus councils generally control most, or all, of the public parkland within their municipality or shire. In the past, few councils have developed positive management policies with adequately structured and assessed priorities for their parklands and have thus been open to pressures from organised sectional interests, such as sporting clubs, for the use of what may be degraded or apparently unused (passive recreation, especially in bushland, has a very low profile) parklands.

Leases are generally at nominal rent and the likelihood of such leases being granted is particularly strong when, as often happens because of the localised nature of the parties concerned, aldermen or councillors have a personal interest in the applicant club or group. Sanders (1981) goes further in suggesting that "cheap leases in parks are a resource which councils often use for purposes of political patronage" given away "as spoils to supporters of local politicians".

Many such alienations in the past have been, and are being, opposed by community groups and a series of independant judgements by both the Metropolitan Lands Board and in the courts (discussed in detail later in this chapter) have upheld the principle of freedom of public access to public reserves, ruling against exclusive leasing of such areas.

The purpose of this chapter is to examine in detail the circumstances surrounding the alienation of an important section of foreshore reserve on the Lane Cove River and Swaines Creek by lease to Chatswood Golf Club for the purposes of golf course holes, first taken out in 1947. It is a classic example of the process of alienation over time - the success of an organised club of relatively powerful men over the more diffuse public interest and the problems of 'maintaining the rage' or even remembering the issue as years go by.

8.1 History of the Alienation

The subject land lies to the south of Fullers Bridge on the east bank of the river and along the lower part of Swaines Creek. Along this bank of the river downstream to Stringybark Creek and upstream to Fiddens Wharf a 100' (approx. 31m) reservation was placed in approximately 1880 although without dedication. Various sections of this 100' reservation were subsequently dedicated for public uses, mainly wharfage and recreation, while some portions were sold to the owners of land behind the reservation. However, along most of this stretch of river now, with the exception of the cornflour mills, this land is now public reserve for recreation.

In the 1920's, Willoughby Council was particularly active in securing parklands and their foreshores for the public, actively supporting the Lane Cove River Beautification/National Park Scheme. Prior to this, in 1920-21, they had tried to obtain a

part of the lower end of Chatswood Rifle Range from the Commonwealth Government for parkland (unsuccessfully as the price was too high)[2]. They obtained the dedication for public recreation of most of the 100' reservation between Swaines Creek and Blue Gum Creek and successfully fought an application by Clifford Love to purchase a 44' section of the 100' reservation wedged between their cornflour mills and the waterpipe/footbridge easement in a case before the Metropolitan Land Board in 1929.

Willoughby's efforts to reserve the river foreshores were sufficiently well known to prompt Ryde's Town Planner to draw to their notice the government gazette's call for objections to the Clifford Love application "knowing well the trouble your Council has had in trying to reserve the water frontage of the river". They probably also prompted the dedication of 5 acres of the Lavender Estate in 1929, which became the nucleus of Mowbray Park.

The area now utilised by the golf course consists of parts of three different reserves (see Map 15):

1. That part (approx 3 acres) of Burns Park which lies along the south bank of Swaines Creek. This park is Crown Reserve, part of the 100' reservation which was notified for public recreation on 14th September, 1909 and is under the trusteeship of Willoughby Council.

2. Approximately two thirds of the 100' reservation along the north bank of Swaines Creek and the river to Fullers Bridge, part of Crown land reserve R59294 from sale (and formerly R59294 from lease generally) notified on 5th November, 1926 for public recreation, also under the trusteeship of Willoughby Municipal Council. The leased area is 6 acres of which approximately two thirds is used for golf holes.

3. 4 acres constituting part of the O.H. Reid Memorial Park (formerly known as part of Fuller Park) which was resumed at a cost of £3250 from Mr Peacock, owner of a total of 38 acres of the Loxton Estate, and gazetted for public recreation on 8th September, 1933. This was financed from a Parks Loan and cost and additional £2268 in interest over a twenty year period (Engineer's Report, 14.6.45).

The total leased area of public reserve is approximately 13 acres.

Whilst the use of part of Burns Park also represents alienation of public parkland to a private sectional interest, this discussion will centre on the adjacent areas north of Swaines Creek which have been the subject of public controversy since the 1930's.

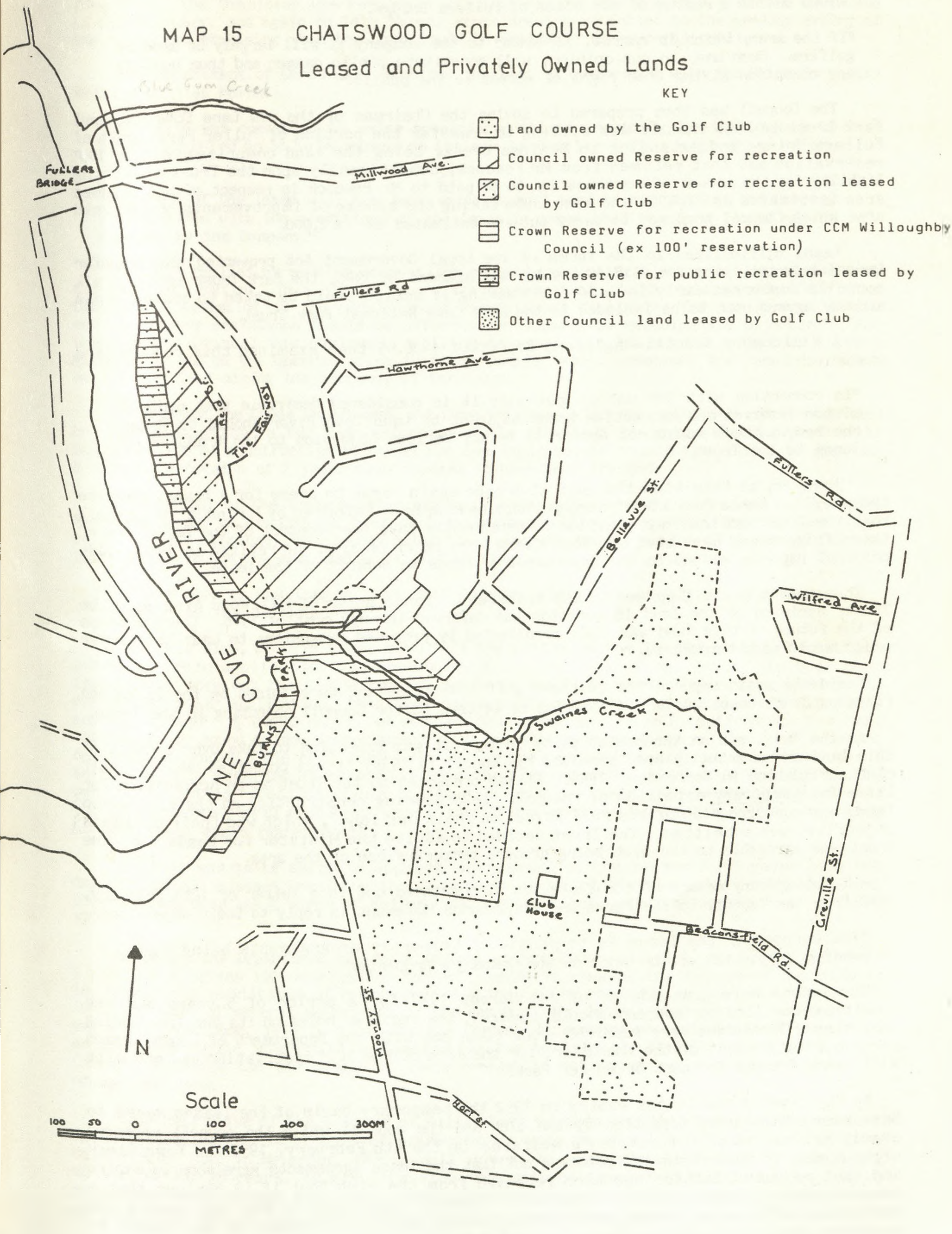
In 1936 the Surveyor General, on the advice of the Lane Cove National Park Committee, asked if Willoughby Council was prepared to consent to the withdrawal of control in favour of the Trust (to be formed) of certain 100' reservations. Council advised consent in 1937 to transfer of its reservation to the north of Millwood Avenue but, as Chatswood Golf Club had also approached the Council in September, 1936 regarding a lease of 17 acres of public parkland between Fullers Bridge and Swaines Creek, this area was not included. In maps and correspondence between the National Park Committee and the Department and Minister for Lands regarding the lands to be included in the Trust when the park opened, these lands were always included.

Opposition to the proposed lease was initiated, and led, by Alderman P.W. Sims from West Ward. He was also a member of Chatswood West Progress Association which was approached to support the golf club application. Initially, his was a lone but vociferous protest with the businessmen of the golf club having well organised influence which included stacking of the Progress Association meeting and other public meetings. Extracts from his diary indicate that he was even threatened financially (in respect of his pension) at this time.

However, the proposed lease received local publicity and Alderman Sims enlisted the support of other organisations such as the Parks and Playgrounds Movement and the Town Planning Association to oppose the lease, as well as forming a local group, the "Hands Off the Park" Committee.

By November, 1936 the application had been amended to a lease over 6 acres. In Council, only 4 of the 12 aldermen opposed the lease but they fought a final decision through motions and recission motions while public opinion over the "golf club grab" gained momentum and two further aldermen joined the four. Thus Council was evenly divided. The issue was finally passed by Council to a Metropolitan Lands Board enquiry to which a number of supporting organisations presented objections to the lease and which received a great deal of publicity.

In July, 1937 the Land Board rejected the application by the Golf Club in a decision which included the following statement:



MAP 15 CHATSWOOD GOLF COURSE
Leased and Privately Owned Lands

"The subject reservation comprises well grassed river flat, picturesquely situated...In our opinion, the area of flat land in the locality suitable for games and recreation is inadequate. We are informed there is a population of 50,000 within a radius of six miles of Fullers Bridge.

"If the area, which is narrow, is leased to the company it will largely be used by golfers. Such use, in our opinion, will constitute public danger and thus nullify any condition giving free right of access to the public."

The Council was then prepared to advise the Chairman of the new Lane Cove National Park Trust in 1938 that it was willing to transfer the portion of Fuller Park south of Fullers Bridge and extending to Swaines Creek, being the land comprised of the 100' reservation and that resumed from Mr Peacock, conditionally upon the Trust accepting liabilty for the amount of compensation to be paid to Mr Peacock in respect of the resumed area (estimated at £2,000) and also undertaking the scheme of improvements on the said area which Council proposed to carry out and estimated at £2,000.

Legal difficulties in the terms of the Local Government Act prevented the transfer immediately but, when Sec. 518 of the Act was amended in 1945, the Park Trust wrote to all councils concerned early in June, 1945 asking if action could be taken to enable areas already agreed upon to be included in the Lane Cove National Park Trust.

A Willoughby Council Engineers Report of 14.6.45 then examined this request and stated:

"In connection with the matter generally it is considered desirable that control of the Reserves and Recreation areas adjacent to Lane Cove River should be under one body.....there would not appear to be any serious objection to the transfer of lands to the Trust."

However, at this time the golf club once again began to press for a lease, despite the previous Lands Board decision, perhaps having been informed by 'friends' on Council that the Trust was now in a position to permanently take over control of the land. One of these friends may have been the Town Clerk who, later on after he retired in 1956, made personal representations to the Department of Lands in support of the lease.

Thus, while Council agreed to the transfer of lands north of Millwood Avenue to the Trust, decision on the land in question was deferred through most of 1946. Consideration of the future of this land was also complicated by proposed extensions to Lady Game Drive which would pass through it.

Residents again opposed the proposed golf club lease and were joined by the Parks and Playgrounds Movement who wrote a series of letters to the Council objecting to the lease.

As the Trust was an interested party in that it was expecting to take over control of this land as had actually been promised by Council in 1938, it was consulted over the golf club application in September, 1946. It was presented to the Trust as an application for lease for temporary extension of the golf links pending construction on the club's own land, and a sketch plan of the full layout on their own land[3], which was their ultimate objective, was submitted. The Trust decided to advise the Minister for Lands that the Trust was agreeable to the club being granted temporary use of the area.

The temporary nature of the lease was also pointed out in a letter of 12th February, 1947 from the Council to the Parks and Playgrounds Movement in reply to their objections:

"The purpose of the lease is to permit of temporary arrangements being made pending completion of the work on the Company's property."

The leases were granted, as of 1st March, 1947 for a period of 5 years and one condition specified the company should construct the required holes on its own land during that time. Two leases were required - one taken out with the Department of Lands, which required the consent of the Minister, for the area of the 100' reservation and one with Willoughby Council for part of Fuller Park.

By the time of the leases expiry in 1952 the temporary basis of the leases seems to have been conveniently forgotten by the club and the council while the council appeared overly solicitous of the company's welfare. On the 4th February, 1952 the Town Clerk wrote a memo to Mayor Baldwin, pointing out that the lease agreements were soon to expire and that no communication had been received from the club "but it is obvious that a renewal of the leases will be required". Council then wrote to the club asking its intentions and received back a brief letter of application for renewal of the leases, an engineers report was made and Council informed the club of their consent to the leases on 20th March, 1952. Throughout this correspondence there is no recognition of the temporary nature of their occupation of the land under the terms on which the first leases were

granted.

However, the Department of Lands and the "Hands Off the Park" Committee had not forgotten. The Committee was keeping a watchful eye out for the expiry of the lease and on 6th February, and again on 10th March, wrote drawing attention to the pending expiry of the lease and enquiring when the land would be available for general public use.

The Department of Lands also expected the land to be vacated with the Under-Secretary writing on 31st March:

> "The lease was consented to under special conditions providing for the Company to have completed an 18 hole course on its own land prior to the expiration of the lease.
>
> "The term of the lease will now have expired and I have to ask whether the Company has complied with the conditions of the lease in order that the land leased may be vacated by the Company."

Council replied by seeking consent for renewal, enclosing a statement of reasons from the club and stating, in a highly supportive manner, that "....Council considers that the Company is assisting in the provision of recreational facilities for the general public and that every assistance should be afforded the Company in reaching its objective". For their part, Council was obviously willing to renew the leases for a further 5 years although still on the understanding that the Company would construct the remaining holes on its own land during the currency of the lease.

It appears the Lands Department was none too happy with the situation and recommended to its Minister that a two year extension of the old lease to enable the club to fulfill the condition of constructing holes on its own land, rather than a new lease, be granted. A further extension of 2 years also appears to have been granted.

The matter of the leases arose again in late 1955 when the Parks and Playgrounds Movement wrote to the Council over such extensions to the lease, pointing out the strict terms of the original leases regarding the Company's construction of holes on its own land, which it had not complied with, and warning:

> "If this goes on any longer, the Golf Company might reasonably claim a vested interest in the people's park".

The golf club, at this time, also felt the matter of the lease needed to be settled and made fresh application in January, 1956 for renewal of the lease. In this they immediately bore out the misgivings of the Parks and Playgrounds Movement by stating, in support of their application, that they had been in occupation of the land for 8.5 years and spent over £10,000 on it, as well as maintenance. Their intentions for the land also began to sound ominously permanent with the statement that one of the three holes on the leased land "is the only long hole in the present course and the continued use of these holes is regarded as essential from the playing point of view". The club's only mention of public access or rights continued to rest on their figures that two-thirds of the 30,000 games played each year were played by non-members (without specifying how many players these games represented).

Council was quite happy to approve the renewal of the leases for 5 years with the deletion of all clauses requiring the Company to construct further holes on its own land. Thus a lease over the 4 acres of Fuller Park was taken out with the Council from 1st June, 1956.

However, the Department of Lands was not as compliant - in fact, they found a further 5 year lease of the 100' reservation "objectionable" in view of the failure of the club to implement the conditions of reconstructing the course entirely on its own or Council's land, in spite of several extensions of the terms of the lease. They would grant only two years from 1st June, 1956 in order for the Company to arrange reconstruction of its course so that the public land could be vacated (letter to Council, 13.8.57). The club and the Council protested and the result of their protest is not known but the club continued to occupy the land.

When the lease of the 4 acres of Fuller Park expired in 1961, the Lands Department again reiterated the importance of preserving as much as possible of both banks of Lane Cove River. But, in November, the Council agreed, in principle, to renewal of the lease, this time for 28 years, to give the club "security of tenure" (S.M.H. 7.11.61). Due to concurrent negotiations with the Lands Department over the 100' reservation, this lease was not finalised but the golf club continued to occupy the land.

Throughout the period of the leases thus far with the Department of Lands insistence on the return of the land to the public, the Labour Party was in government in NSW and

grappling with problems of planning and the Cumberland County Council plan. In 1965 the Liberals took government and in 1968 lease renewals were granted for 10 years. The Minister for Lands, Tom Lewis, insisted that prior to approval of the lease "extensive consideration was given to the club's occupation of the area and public requirements in relation thereto" and that a further review would take place in 1977. He had also accepted a 'fait accompli' in respect of the extent of the club's land ownership:

> "The club does not have sufficient freehold land on which to construct a standard 18 hole Golf Course and therefore it has not been requested to develop an alternative area."[4]

What had happened to the land shown in the plan submitted to the Lane Cove National Park Trust in 1946 of the "full layout on their own land"? Had land owned by the club been sold to obtain finance for the club's development or had the club's ideas of a 'full layout' merely become more grandiose thereby requiring more land?[5]

Through the 1960's Miss Edith Sims, daughter of Alderman Sims who had led the fight against the 1936 lease, kept the issue alive by a succession of letters to the Council and the Minister for Lands. In November, 1973 she renewed her correspondence with the Minister for Lands, still Tom Lewis, and received a most welcome reply:

> "When the club's lease expires in 1977, a portion of the land leased by the club will become available to the community for public recreation.
> "If Willoughby Council wishes to enter a lease with the club for the remainder of the land the Department of Lands will favourably consider it.
> "It is hoped that full use will be made of the attractive strip of riverside land which these arrangements will provide."[6]

However, 5 months later the Minister wrote again with not only a reversal of the earlier decision but a further decision to revoke a section of the reserve and offer the club a 40 year lease over the revoked area! This was purported to be due to strenuous objections received from Willoughby Council regarding the severity for the club of the earlier decision - withdrawal of the reserve area from the golf course "would prove a handicap to future development". It is likely that Laurie McGinty, former Mayor of Willoughby for 8 years, including the period when the 28 year lease was approved, at this time MLA for Willoughby and political cohort of Tom Lewis, also had considerable influence on the dramatic change of mind of the Minister.

At this point Miss Sims moved out of the district and she attempted to pass the continuing battle onto other groups. Lane Cove Bushland and Conservation Society declined to become involved as the land was not within the Lane Cove Municipality but David Jenkinson of the Union of Lane Cove Valley Conservationists took up the cudgels. Jenkinson was very vocal and received considerable publicity on this, and other, issues in the early 1970's but the Union was not particularly strong in the late 1970's when the lease came up for renewal.

By this time the issue seems to have died - those who were part of the controversy in the early years had died or moved away while newer residents accepted the status quo with little idea of the land's history and its status as public reserve. Thus the leases, with all three parcels of public reserve combined under one lease, were renewed, with the approval of the Minister, Harry Jensen, from 1st November, 1977 for 15 years. The annual total rental for this 13 acres was set at $1,000, with review in 1982 and 1987.

Thus we have a situation where a private organisation obtained leases over a relatively scarce type of public reserve lands (riverside flats) in a valuable position specifically on a temporary basis while it developed its own land. It then created a vested interest by extending its occupancy and investing in development of the land, possibly sold off its own land then claimed it needed the public land on a continuing basis because it had insufficient freehold land to develop an 18 hole golf course.

This was done with the co-operation and support, perhaps even collusion, of Willoughby Council which probably had members of the golf club in both administrative and elected divisions at various times. Perhaps for some of those in, or on, Council, their support for the leases sprang from a genuine belief that the provision of a golf course on this land best suited the public needs but, on the evidence, and as golf clubs usually serve the better-off members of a community, members or non-members, it is hard to escape the suspicion that the support sprang from partisan personal interests. It also contrasts strongly with the efforts of the Council in the 1920's and early 30's to secure parklands and foreshores for all the public.

Some further general points should be made prior to examining the specific situation regarding each parcel of land. Firstly, there is the club's acquisition of a vested interest in the land by occupancy and by investment in development. The former was virtually acquired by stealth given the temporary basis, and provisions, of the original

leases and the reasons for which extensions, especially of the 100' reservation were granted. The latter, estimated by the club to be £15,000 by 1961, must be discounted against the token rental paid for these leases.

If the club made the decision to sell some of its freehold land, they took a considerable risk given the public reserve nature of the land they were leasing and they should bear the consequences of that risk taking. The land of both leases was reserved for public recreation well prior to the establishment of the golf course, especially in the case of the 100' reservation. The acquisition of land and planning for a course should have included the necessary requirements without recourse to the public reserve lands. As one area of public reserve (Burns Park) was included in their course from early in the club's development, they particularly should not have expected to permanently occupy more extensive areas.

Secondly, State Government policy is relevant. State governments, past and present, have frequently expressed the need to preserve foreshore lands for the public and their efforts to establish the Sydney Harbour National Park provide an active example. On the Lane Cove River, from Figtree Bridge to its source, despite past alienations, very little is now in private ownership and/or use. Areas alienated in the past are gradually being returned to the public - at the very least a narrow band of freely accessible land adjacent to the river.

A third point is consideration of public needs. Public need for the land for freely accessible parkland falls into two categories. There is the need by the State Recreation Area (SRA) nearby (formerly the National Park promised the land) for more flat foreshore land as picnic areas.

There is also the need of Chatswood and Chatswood West residents for accessible foreshore local open space. Most of Willoughby's open space is either in the east, on Middle Harbour, or on the west on, or near, the Lane Cove River. Despite this, there is little accessible parkland on the river for informal games, picnics and passive recreation should local residents not wish to foray into the weekend crowds of day-tripper type recreation in the SRA. The picnic/barbeque area on the hill nearby the subject land, created to mollify local protest over the leases is small and has no view of, or access to the river. Apart from the flats across the river on River Avenue (part of the SRA), the nearest local waterside parks are on Middle Harbour or in the Lane Cove Municipality eg. Tambourine Bay.

Yet the middle North Shore is particularly well served by golf links despite their space hungry nature. Within a 6km radius of this course there are 8 other golf courses - at Northbridge and Castle Cove (within Willoughby Municipality), Gordon, Roseville, West Killara/Lindfield, North Ryde, Lane Cove and Cammeray.

8.2 Legal Considerations

The status of, and legal position regarding, the two parcels of land require separate consideration.

The Crown Land Reserve

The legality of the leasing of this land, especially prior to 1978, is questionable on two grounds. The first is in what manner this land was legally 'available' for lease. According to Lang (1973), to obtain a Special Lease (the only Crown Lease available for this purpose), the land must be "Crown Land" ie. lands vested in His Majesty and not permanently dedicated to any public purpose. A recreation reserve is available for special lease unless it is specifically reserved from lease or is reserved for a purpose which is inconsistent with the purpose for which the special lease is proposed. If there is a reservation from leasing, withdrawal of the reservation depends on consideration of the public interest.

In the case of this land, two factors are thus important:

(a) R59295 from lease generally was not revoked until the general revocation of all such leases in 1978 (through amendments of Sections 519C-519F of the Local Government Act, which automatically gave councils power to lease, with the Ministers approval , reserves under their care, control and management). Thus a special lease could not legally be granted.

(b) "considerations of the public interest" in this land were reviewed by the Metropolitan Lands Board in 1937, which decided that land in the locality suitable for parks was inadequate and that leasing "would be prejudical to the public interest". Circumstances of public need had not lessened since that decision.

However, the lease taken out in 1947 was not a Crown Lands Special Lease but a private lease with Willoughby Municipal Council, with consent of the Minister for Lands.

When the reserve was notified in 1926, no specific trustees were appointed, therefore care, control and management devolved onto the local council under Section 344 of the Local Government Act. In order to lease the land, trusteeship with power to lease had to be vested in the Council by gazette notification - effected on 9th May, 1947.

This was a legal method of enabling a lease to be taken out and was frequently done for leasing for uses similar to the intent of tthe original reservation. However, in effect it amounts to a circumvention of the provisions surrounding reserves from lease generally and the granting of Special Leases. In Bingara Golf Club v. Warialda Pastures Protection Board & Anor (1938) 17 LVR 93 the application for a grant of a special lease for golf links, involving the revocation of a reserve from lease, failed because the applicant could not prove these reserves (for stock) were no longer necessary. If the leasing of the Lane Cove River reserve had been put to a similar test, it should have failed on the same grounds.

Secondly, it must be considered whether lease of the land by the golf club constituted an "exclusive" use. Exclusive use leases of public reserves became clearly illegal as the result of two important High Court judgements. In Randwick Municipal Council vs Rutledge and Ors (1959) LGRA 127 the phrase "used for a public reserve" was clarified in that

> "The land must be, in the relevant sense, open to the public generally as of a right, and it must not be a source of private profit." (p.172)

Then judgement against a lease in Storey vs North Sydney Municipal Council (1970) 20 LGRA 178 held that granting exclusive use rights was inconsistent with the use of the land as a public reserve, since that use required that the public has access "as of a right". Subsequent cases have ruled against leases to private groups or clubs on this principle eg. in Attorney General vs Warringah Shire Council (1972) 26 LGRA and Attorney General vs Waverley Municipal Council (1979).

The leases of part of Fuller Park and the 100' reservation have always included freedom of public access as a condition. For example the 1968 lease stated that the general public shall not "in any way be restricted in gaining access" through the area and "carrying on such activities as are compatible with the use of the land for golfing". In some leases, including the current one, the company was required to erect and maintain noticeboards advising the public of its rights, although it is unclear whether this condition was fulfilled over the years.

However, the Lands Board decision of 1937 stated that the use of the relatively narrow area largely for golfing under a lease "will constitute a public danger and thus nullify any condition giving free right of access to the public". In addition, restriction of access only for through purposes or to activities "compatible' with golfing probably does not constitute the land being "open to the public generally as of a right". In a practical sense, the public is denied all use of the land except the right to walk along its edge and even this has been challenged by individual golfers when members of the public have exercised this right over the years. Thus it could be argued that the lease is effectively exclusive and thus illegal.

The 4 acres of O.H. Reid Memorial Park

This parkland is owned in fee simple by Willoughby Council and, as such, may be leased at the discretion of the Council. However, the land was purchased with a Parks loan repaid, with interest, by the ratepayers of the Municipality and it was gazetted as a reserve for public recreation.

There is thus a moral argument which suggests that all Willoughby ratepayers should be entitled to free access to this land as public parkland. It, along with the 100' reservation, was also promised to the general public by being promised to the National Park Trust in 1938. This transfer would most probably have taken place were it not for the time taken to amend the Local Government Act to allow such transfers.

In addition, the same arguments regarding exclusive use of the land, as discussed above in reference to the Crown Land, may also be applied to this public reserve land.

To conclude: the leases are due to expire again in 1992 when the lease of R59294 will again require the consent of the Minister for lands. At this time public rights and public interest should receive more consideration than they have had in the period since the Lands Board decision, in respect of both parcels of land. In the light of the historical development of the leases and public needs, the status and occupation of these lands should be reviewed without prejudgement due to the length of occupation by the club or the shortage of its freehold land.

In the meantime, the major problem for the 'public interest' is that its supporters be ready and able to press for its consideration at the appropriate time. The renewal date is some time off in the future and the status quo is likely to continue automatically with another long lease unless other groups protest at the right moment. While Council and the golf club are stable and continuing bodies with established interests in the land, there is no obvious group to promote the local interest although the management of the SRA can promote their interest if the issue is remembered. This problem could only be circumvented if a case could be mounted sooner challenging the legality of the leasing of the 100' reservation.

References and Notes

1. This chapter is the result of original research from the following sources: Minutes of the Lane Cove National Park Committee and the Lane Cove National Park Trust, Willoughby Municipal Council stack files and vertical files held in the Local History Section of Willoughby Municipal Library and the current lease held by Willoughby Municipal Council.

2. Ku-ring-gai Municipal Council files: Lane Cove River Park, File 1.

3. Although referred to in the Minutes of the Trust, this plan has not been located in the files of this period held at the Lane Cove State Recreation Area headquarters.

4. Letter to Miss Edith Sims 23.7.69.

5. Miss Sims alleges that such sales took place to finance the building of the club's new clubhouse. Some investigation into the land ownership, past and present, of the golf club has been undertaken but a full investigation is beyond the scope of this work and the allegations cannot be substantiated at this stage.

6. **The Daily**, 29.6.74.

CHAPTER 9

THE FREEWAY RESERVATION

This chapter intends to examine the freeway reservation and proposals from two viewpoints:

1. As an early example of the effect of the environmental awakening of the 1960's in the mobilisation of community forces to oppose the proposals of big bureaucracy, at a time when there were few avenues and no machinery for expressing such opposition.[1]

2. To present a current view of the freeway and the possibilities and probabilities surrounding it.

This discussion is largely confined to the particulars of the Lane Cove Valley controversy. The wider setting is further discussed elsewhere by Sandercock (1975) and Cain (1976). Map 16 shows the present location of the reservation. The section of valley and bushland affected is most of that shown in Photo 2.

9.1 The Past Debate

The freeway reservation in the Lane Cove Valley dates back to a comprehensive Department of Main Roads (DMR) report and plan of 1945, which was subsequently written into the County of Cumberland Plan. It was one of a series of 'expressways' radiating from an inner system of distributor roads surrounding the central area of Sydney. The Northwestern Expressway linked the city to Mt. Colah and the Newcastle expressway via the Lane Cove Valley. It was thus one end of an inter-city road as well as having the purpose of relieving pressure on the Harbour Bridge by providing a fast alternative route to the city from many northern suburbs.

As originally planned the expressway followed the eastern side of the valley from Figtree Bridge along the present Burns Bay Road, then swinging west to join the Epping Highway. Possibly as a result of detailed design of the Gladesville interchange in approximately 1960 and upward revisions of future population estimates for Sydney, both of which upgraded the size and scope of the proposed Lane Cove Valley expressway, DMR planners took a harder look at the proposed route and decided on relocation to the western shores. The advantages given for the western route were:

a) it was shorter
b) it enabled upgrading of the geometric standard of the road for greater capacity, speed and safety
c) it affected less private property - the eastern route wholly or partially affected 101 houses and 81 vacant lots where the western route required resumption of 5 to 10 lots
d) it could head further north without interfering with the Epping Highway, allowing segregation of local and expressway traffic.

Two other elements probably also influenced the decision. One is the DMR view of Crown lands as 'free' and reserve lands as 'vacant'. Most of the land along the river affected by the relocation had been reserved for recreation well prior to the CCC plan (from Boronia Park to Kittys Creek) while the remainder had been designated County Open Space, but to the DMR it was convenient and available land.

Despite being forced into an age of environmental awareness by two decades of protest and the provisions of current planning legislation, these attitudes still persist. For example, the DMR recently described urban bushland of the Castlecrag escarpment as 'vacant' land on the basis of its ownership (DMR or private) (submission to the Warringah Transport Corridor Inquiry, Nov.1981, Vol 1. p.73).

The second element was the vision of this expressway as a parkway amid natural surroundings affording lovely views for the motorist. DMR engineers and planners had been most impressed by the achievements in European freeways and were proud of their oblique aerial view looking up the Lane Cove Valley with the aesthetic curves of the freeway superimposed[2]. Thus part of the proposal involved expressway on two levels around the foreshores of Boronia Park to give maximum scenic views to travellers in both directions.

In February, 1967 a local paper reported a meeting of representatives of Hunters Hill, Ryde and Lane Cove Councils, the Chairman of the State Planning Authority (SPA) and

senior officers of the DMR, which approved the relocation. Apart from the attraction of the scenic parkway concept, the major reason for the concurrence of the local mayors appears to have been the reduction in rateable property and ratepayers affected. In August the DMR wrote to the SPA to request the new location be included in planning schemes. This could be effected under Clause 20 of the County of Cumberland Planning Scheme Ordinance but it was not until August, 1968 that affected landowners on the western side were notified of the proposed relocation and the exhibition of plans to take place in September.

These notices sparked the immediate formation (within a week) of the "Save the Lane Cove Valley" Committee - the newspaper article of 18 months earlier appears to have had little impact. The prime movers of the committee were the significantly affected residents along Barons Crescent, Hunters Hill, but they were soon joined by other interested residents as Hunters Hill already had a population of conservation conscious people belonging to, or supporting the newly formed Hunters Hill Trust. The Trust was an early conservation group interested in the man-made and the natural environment and the main protagonist in one of the first tussles over a piece of Sydney's urban bushland (the battle for Kelly's Bush).

However, it was hard for the new committee to escape the charge that it was really "Save OUR SIDE of the Lane Cove Valley" as they had made no protest while the expressway was planned for the east, a point pressed home by the Lower Burns Bay Association (of residents on the Lane Cove side). The committee was, of course, able to point out in their defence that the new location affected large areas of remnant natural bushland - natural areas and amenity which was less affected in the eastern location.

Nevertheless it was hard to argue that it should be relocated back on the east to further affect the homes and future of those living there. The only morally tenable argument was to maintain that it should not be built at all. At first, however, they merely argued that the proposed relocation was contrary to the public interest due to the destruction of nature reserves and thus the deterioration of the Sydney environment. The committee thus was fighting both the State Government and the residents on the eastern side. Local newspapers headlined the 'confrontation' or 'war' between the two resident groups (eg. **Lane Cove Advertiser,** 5.12.68, **North Shore Times,** 4.12.68).

A very vigorous campaign was launched and letters were fired off to Members of Parliament and Ministers, Directors of government departments and authorities, all local groups including nearby conservation groups, schools, P & C Associations, Scout Groups, the local councils, state and national conservation groups, Trusts of State Parks and Reserves in the Sydney area, the SPA, all the local papers and the Sydney Morning Herald. From this letter campaign a great deal of publicity and support from many quarters was raised.

The Committee presented a petition with 2,500 signatures to the Legislative Assembly and put together a representation to the SPA regarding the relocation. This 1968 representation did argue directly against relocation in terms that no need for relocation had been established nor was such relocation less costly financially yet the probable environmental impact was considerable. The Lane Cove residents had lived with a reservation for 15 years and thus its effect on housing was no reason to change it. In 1968, there was no argument against an expressway, per se, in the Lane Cove Valley.

Such a 'representation' was the only available means of official protest. Under Clause 20, only persons with property affected by the proposal were allowed to object. The SPA was required to consider all objections but there were no provisions or machinery for instituting a hearing for objections or a special inquiry into the proposal. In a letter of 15th November, 1968 the SPA pointed out to the Committee that the approval of the mayors of the local councils obtained 18 months earlier "should be accepted as an expression of view of the duly elected representatives of the community concerned". Thus the SPA and the DMR were fulfilling their statutory obligations and could claim to have sought local community views while leaving local residents feeling powerless and frustrated.

In a letter of 23rd October, 1969 the SPA informed the Committee that "after careful consideration of all objections and representations" the relocation had been approved and notified on 10th October, 1969. No reasons or explanations were given, despite the year of controversy and publicity, until the matter was brought up in Parliament by the local MLA, Peter Coleman, who was promised, and received, a full statement of reasons (as detailed earlier) from the Minister for Highways, Peter Moreton. The 1967 local council concurrence was once again dragged out as indication of local support at that time. It was planned to start the expressway as soon as possible.

Whilst a certain degree of reluctant acceptance (due to the lack of avenues through which to fight) pervaded the valley, the Committee continued its efforts, supported by Hunters Hill Council (whose composition had now changed due to the influence of Hunters

Hill Trust at the 1968 elections) and by obtaining some expert help to draw up alternative solutions.

By 1972 there had developed considerable Sydney-wide community opposition to expressways, per se, as well as greater concern for environmental issues. The Neilsen Sydney Area Transportation Study (SATS) was in full swing and there were a number of newspaper articles questioning the concept of urban expressways and pointing out the abandonment of such schemes in Melbourne and Adelaide[3]. In addition, the government had made a Declaration on Environmental Impact which essentially involved the proposition that no decisions having environmental impact would be made without considering all environmental issues.

The Save the Lane Cove Valley Committee added their bit by further lobbying and having their issue raised again in Parliament by Peter Coleman. In conjunction with the Hunters Hill Trust, they organised an armada of boats to explore the waterway in October, 1972 to which they invited government representatives.

However, when the SATS was finally completed in 1974 the principle of expressways as the solution to traffic problems had not changed, only become more expensive. The technologically grand schemes of the highway engineers made no concessions to the changes in public opinion and community needs. They were firmly supported by the Askin government's vision of the city splendid, embodied so well in the concepts of the 1968 Sydney Region Outline Plan with its preoccupation with Sydney's "pre-eminent position as Australia's greatest city, commercial and port of world status and importance" and little to say about the city as a place to live. The Lane Cove Valley Expressway was part of the Northwestern Expressway, a vital part of the infrastructure to support this 'pre-eminent' city and its north-south links in the coastal belt.

When the Labour government was elected in 1976 it was far more willing to heed the people's protests over expressways for two sound political reasons: many of the expressways affected traditional Labour seats or marginal seats, and expressways were extremely expensive and the new government had many other vote-winning priorities for its funds in order to consolidate its then precarious hold on government. In view of general public opinion, abandoning expressways in early 1977 was most politic. However, only some were scrapped and the Northwestern was one which remained although a possible construction date was pushed well into the future.

Thus the reservation still exists and construction has begun on a section of the Expressway not far to the north - from Hornsby to Wahroonga. Since the scaling down of freeway construction and the pushing back of the possibility in the Lane Cove Valley, the Committee has virtually disbanded and the very active Hunters Hill Trust remains the watchdog of conservation issues in the area, counting amongst its members many from the old Committee.

9.2 The Effects of the Freeway Reservation

Road reservations have the effect of putting land 'in limbo'. Where this land has been Crown bushland, the effect has been to preserve such land from development for 30 years and thus it has been available as de facto open space. When such reservations have been abandoned and the needs for the land re-evaluated in the late 1970's and 80's, the result has often been that the land has been officially created open space such as in the Warringah Transport Corridor and on the Cooks River. The overall effect of the reservation has been the preservation of bushland areas, now relatively scarce within the urban area, for reserves.

However, this may only apply to some relatively small sections of land in the study area. Most of the land was already reserved open space prior to the 1948 CCC plan and the remainder was zoned County Open Space in that plan. Under the plan the purpose of the open space was for both recreation uses and to help establish the identity of districts - "a green web following the lines of watercourses and land unsuitable for building to make an almost continuous network through the urban areas to bring everyone within reasonable reach of green grass and shady trees" (Winston, 1957).

Whilst the Save the Lane Cove Valley Committee argued against the 1968 relocation on the grounds of environmental damage such as pollution and damage to mangroves, and the loss of reserves, it did not put the relocation into the wider framework of the concepts behind the CCC plan which originally contained both the expressway and open space reservations.

The effect of the existence of the reservation over this open space has been to cast a blight over the whole potential of the river and foreshores below Epping Road Bridge. There is no interest in expenditure on or near such 'DMR affected ' land.

The greatest single problem is the lack of any overall planning concepts or guiding principles to manage and develop the river foreshores and adjacent areas in any coherent way. Part of this is the reluctance of landowners or trustees to even make decisions regarding the future of the land, let alone invest in it, the major exception being the development of the Boronia Park walking track by Hunters Hill Council and the 1985 regeneration of the dredge works site on Sugarloaf point by Lane Cove River Park Trust. The net effect has been the neglect of prime waterfont natural and semi-natural area both physically and in terms of their availability to the people. At the same time, development goes ahead on nearby land, eg. the Lane Cove Industrial Area, or other parts of the valley, without consideration of impact on the natural qualities of the valley or the coherence of the valley space because there is no demonstrated unity, or plan, to impact.

9.3 The Possibility of a Freeway

The DMR stated in early 1983 that the construction of the Lane Cove Valley Expressway does not fall within their 10 year forward planning (Keith Newton, DMR, pers comm.) and at that time gave the impression that eventual construction was not a strong possibility. However, a proposal by a small alternative school to lease some DEP owned land in the path of the freeway a little to the north was refused by the Minister for Roads, Laurie Brereton, in mid 1984 because it would create too many difficulties in the community to evict the school "when the freeway is built"[4] (my emphasis).

Thus we have a stand-off, with a reservation but lack of any plans on the one hand and a considerable number of well organised conservation groups who would spring into action should such planning begin. Arrayed against these conservation groups in the community are those who endure traffic problems in the Ryde area and along Victoria Road. As a consequence, Ryde Council is likely to favour any road proposal which will solve this. In the Hornsby area it has been local residents, the Council and the local MLA who have pressed so successfully for the construction of their section of expressway to solve Hornsby's traffic problems. Should a National Liberal coalition gain power, Ku-ring-gai Council, in blue-ribbon Liberal territory, would be likely to press strongly for this lower valley link. Nick Greiner, Liberal leader, has stated that its construction would be a high priority for a Liberal government. It represents an ideal piece of obvious action for a new government and would be distinct from preceding Labour policies.

However, two crucial questions have yet to be resolved and these ultimately will decide the fate of the expressway under the present government above any other questions. The first is the location of the second airport, if there is one. If it is located at Scheyville (Pitt Town), Richmond or any other west to northwest site, the major access will be via the Western and Castlereagh Expressways and the Lane Cove Valley links the Castlereagh to the city. That an airport must have high quality road access is almost unarguable and issues of environmental impact in the valley pale into insignificance next to that over-riding fact. The only opposition lies in an alternative which probably does not now exist.

The second question involves the necessity for expressways within the urban area. A lead article in the **Bennelong Cosmopolitan**, 3.5.78, representing the views of Lane Cove Council, set out quite clearly some of the arguments against high grade, high speed expressways for urban areas. It argued that, while there was a need for new roads for through traffic with minimum interruptions from property access, intersections and ribbon development, it was not necessary to build such roads to high speed standards. Travel distances within the urban area are relatively short and

> "savings in travel time by allowing a higher maximum speed are negligible and certainly not justified by the cost of the high speed expressways or the social cost of the effect of the high speed expressway on the environment".

If these roads were designed to lower speed standards, say 60kmph instead of 80kmph, they can be designed with alignments and grades which fit closely to the existing topography and considerably reduce the impact on, and severance of, communities. In addition, the cost of a full expressway system in an urban area is so high that a complete system cannot be realised, leaving bottlenecks and delays at each end of the expressway sections as vehicles filter back into the local network.

Thus it can be argued that expressways are appropriate and desirable for inter-city travel but that when they reach urban areas they should devolve into a network of smaller distributor roads, as described above, which can be threaded through the present urban fabric rather than cutting large swathes across it.

9.4 The Impact of a Freeway

This study does not purport to have conducted environmental impact investigations regarding the expressway proposal. However, some general statements of overall impact can be made.

With the current 'state of the art' in road and bridge building, allied to environmental knowledge and impact studies it is likely that the expressway could be built with low erosion potential and pollution of the river. Buffalo and Kittys Creeks would be bridged at high level and impact on mangrove communities would be minimal, particularly as they regenerate rapidly.

The major impact, which can in no way be mitigated, is the devastation of the naturalness and integrity of this waterway. Despite the historical changes along the river and the development which has occurred, the river valley still has a dominantly natural 'feel' (which could be enhanced further by judicious treatment of existing development) - an enclosed and peaceful retreat in the middle of suburbia. It is also distinctly different in nature and quality from other reserves within a considerable radius. At the same time, this naturalness is preserved within a very narrow belt and the building of a road, especially a freeway, within this belt would virtually destroy its values in:

a) the physical space the road would occupy ie. the amount of vegetation and bushland removed from the relatively small patches now existing.
b) the aesthetic viewpoint - however gracefully roads and bridges are designed, in this situation they must destroy naturalness values.
c) introduction of other pollution - a road would introduce both noise and air pollution to a confined valley situation where they are not easily dispersed.
d) the isolation of long stretches of the shoreline from its adjacent bushland and possibly from public use.

More specifically, the freeway proposal involves virtually the complete loss of the foreshore strip between Boronia Park and Buffalo Creek. Although narrow, this strip is a very important link between the larger Boronia and Field of Mars Reserves both as a corridor for wildlife and from a human recreational, aesthetic and educational viewpoint. It has a well developed and well used walk and it is one of the very few stretches of river between De Burghs Bridge and the mouth where an impression can be gained of the river before the advent of white man. As part of these values the strip also has a number of Aboriginal midden sites including an art site (painting) of some significance - an indication of its aboriginal use in its pre-white man state.

It would also mean the destruction of Sugarloaf. Although only part of Sugarloaf may be used, a large rock cut with a freeway through its centre would virtually destroy its ability to survive as a small but high quality bushland remnant and make it impossible for it to be used for educational purposes in association with the nearby Field of Mars Reserve. If the proposed crossover to Lane Cove was also built, most of Sugarloaf would be destroyed.

Large rock cuts and a swathe taken through the middle of bushland north of Kittys Creek would also fragment one of the few larger pieces of bushland remaining along this section of river.

9.5 An Alternative

For a variety of historical reasons, almost the entire Lane Cove River above Figtree survives with its foreshores in a relatively undeveloped state with each stretch offering its own distinctive qualities. The freeway, or any road along the valley floor, near the river, would destroy forever many of those qualities along this part of the river. All of the land through which it passes constitutes some of the last remnants of the Field of Mars Common, set aside in 1804 for general use by the people. When it was subdivided in the 1880's the reserves were again set aside for the general public, as parks. The concept of the extension of these reservations to include the entire foreshores of the Lane Cove River has been an ideal sought after in many plans since 1900 as well as being part of the CCC's 'green web'.

It is thus obviously desirable not to build a freeway, or even a new road along the foreshores or through the bushland of the valley. However, even if the second airport is not in the northwest and the concept of smaller city through roads is accepted, there is likely to be a need for a minor traffic artery to serve the local purposes of the proposed freeway, that is, to relieve pressure and congestion caused by traffic from the northwest and possibly even to syphon traffic towards another crossing of the Parramatta River at Bedlam Point.

The upgrading of Pittwater Road, in the style of parts of the Epping Highway (ie. the type of distributor road discussed earlier) is an obvious solution to serve these purposes. It is already an important traffic route but still with poor alignments and curves in the vicinity of Sugarloaf and the Field of Mars Reserve. A high level bridge from behind Sugarloaf to near the former Buffalo Creek tip would create an almost straight road from Epping Road through to Gladesville. It also has wide margins of undeveloped land along much of its length available for widening. Even with upgrading to widen, reduce intersections and direct access, and provide pedestrian and vehicle access across it, this would be a far less costly through road than a freeway, or even a smaller road along the freeway reservation, - financially and of reserve lands. The valley could then be freed for adequate open space planning.

It may not prove less costly in resident losses in terms of access or in portions of their frontages. The freeway, however, is not without disruption and resumption and the Pittwater Road alternative would be unlikely to involve resumption of whole lots or total change in residential amenity as would occur for those in Barons Crescent, Thorn Street, Magdala Road and Gilda Street along the route of the proposed freeway.

To conclude: a freeway along the middle Lane Cove Valley has been planned since the County of Cumberland Planning Scheme but has been vigorously opposed locally since its relocation to the bushland and long-standing reserves of the western shore. As now planned, such a freeway would utterly devastate both the narrow strips of remnant bushland through which it passes and the natural values and integrity of this part of the Valley - a rare and important resource in an urban area. In addition, historically it belongs to the people as reserve land.

Local environmental awareness and the organisation of local groups has grown greatly since the days of the Save the Lane Cove Valley Committee. Since then, environmental planning legislation has introduced mechanisms providing for considerable community participation in planning and proposed construction of the freeway would face considerable articulate opposition.

Notes and References

1. Major source was files and cuttings of the "Save the Lane Cove Valley" Committee (held by Mrs S. Swaine, Alderman, Hunters Hill Council).

2. A copy is held by the Lane Cove State Recreation Area.

3. For example, in SMH 26.6.71, 6.4.72, 12.12.72.

4. Letter to Sydney Montessori Society, 10th May, 1984.

PART III
THE FUTURE OF THE VALLEY

CHAPTER 10

THE ROLE AND POSSIBILITIES OF THE MIDDLE LANE COVE VALLEY FOR RECREATION

This chapter starts with the basic premise of the reservation of the foreshores and remaining bushland in the Lane Cove Valley, especially the study section, for open space and recreation.

Other uses of the land are possible and some may even be quite profitable - with current building techniques, topography would no longer be a bar to residential development, provided road access is possible, and the river views would bring high prices. It also provides a straight corridor for a freeway (discussed in Ch. 9) or other forms of transport but there is little suitable land to expand industry outside the Lane Cove West industrial area. Government office/laboratory development, such as the CSIRO on Delhi Road, North Ryde, could be expanded - a decentralised source of employment ideally located amongst its labour force of professionals of the north and northwest.

Rejection of other such uses is for three reasons. Firstly, the long history of attempts to secure a whole valley park - this concept has as much merit today as it ever did and, with imagination, foresight and co-operation between the multitude of parties concerned, it is still possible to realise it. Secondly, there are considerable current open space zonings in these areas which derive from the CCC vision of the valley as part of its green web through the city (Map 16). However, the most important reason is the prime value of river valley and foreshore areas for recreation (discussed in this chapter).

This chapter will examine the resource, its value and possibilities for various types of recreation and examine the need for such recreation space. Many of the recreation types discussed are compatible with natural area conservation and educational uses, which will also be discussed at the end of the chapter.

10.1 The Value of the Resource

It is a basic contention of this study that the section of waterway and bushland under study is a prime recreation resource which has been neglected and abused and, at present, lies largely idle and wasted in a context of great strain on nearby recreational resources.

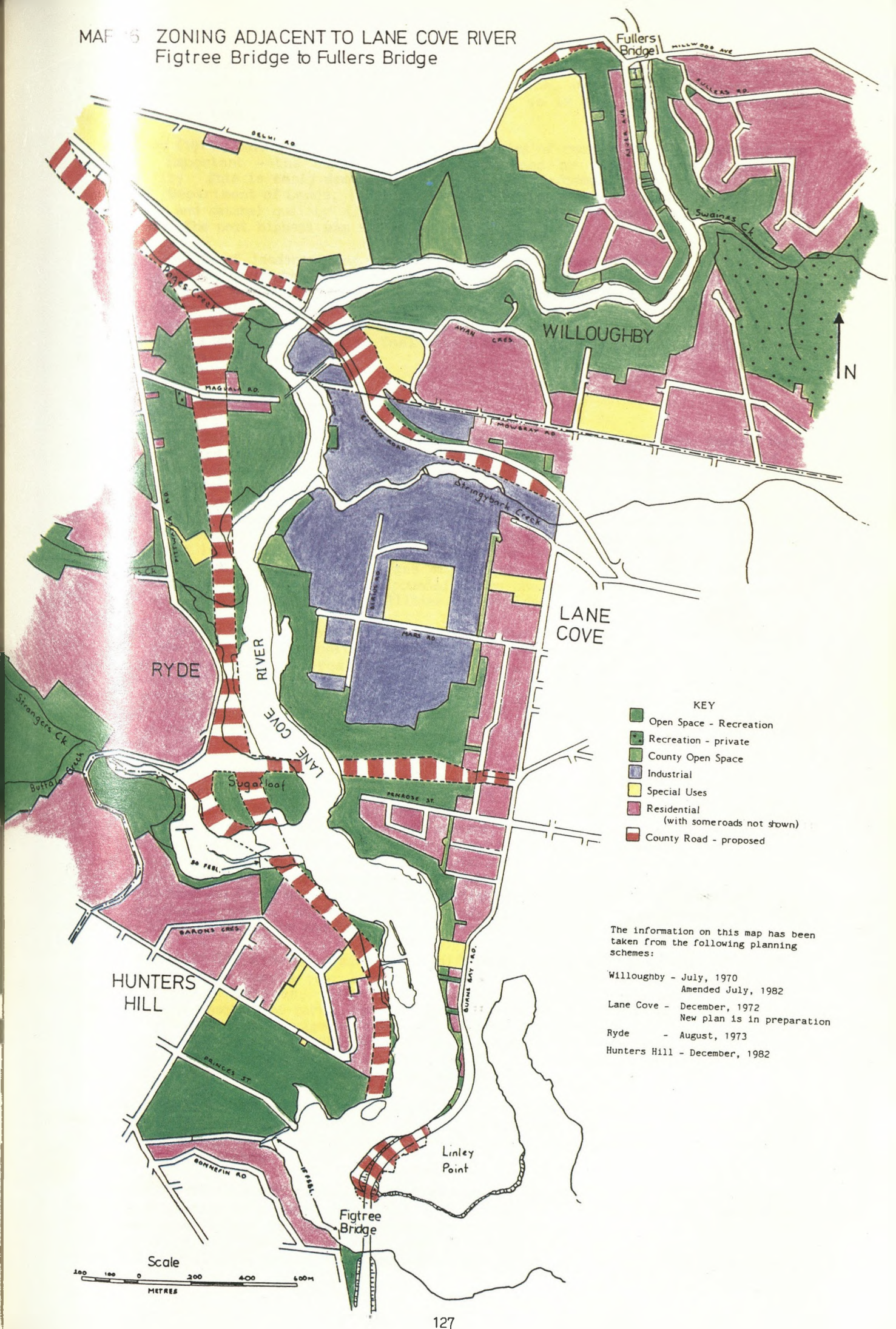
Why is this area so valuable for recreation?

Essentially it encompasses three major aspects which favourably influence our choice or preference in sites for picnics and passive recreation. Beazley (1969) notes these as preference for edge or fringe - the line where one ecological pattern meets another, such as the bank of a stream or the edge where woodland changes to grassland. Reinforcing this instinct to settle on the edge is our primitive fear of forest and deep woodland (wilderness, dangerous beasts) - open spaces are reassuring because of the ease of view at a distance but it is uncomfortable or insecure to sit in the middle of such open space. But, overwhelmingly, the presence of water is the "infallible lure that draws all of us...its very presence gives peace and a sense of space far greater than that to which there is access. There is the endless fascination of watching the shifting light upon it".

Particularly since the U.S. Outdoor Recreation Resources Review Commission (ORRC) (1962) reported that water was the focal point of outdoor recreation for both active water-based sports and for passive recreation, the importance of the development of water based resources for recreation has increasingly been recognised and acted upon. Rivers, lakes, dams and reservoirs and their surrounds have become foci for recreation, generally with an emphasis on multi-purpose use.

It could be argued that Sydney is abundantly endowed with water as a focus for recreation, particularly in its eastern half. However, most of this exists as large open, often windy, stretches along the beaches or in the harbour. Only the upper reaches of Middle Harbour can provide the same enclosed river valley environment as the Lane Cove River in the heart of the urban area. The Woronora River to the south and Cowan Creek to the north are similar but are on the extreme edges of the city and are more limited in flat foreshore area. All these rivers are incised into plateaux providing a defined space - a valley with the sense of enclosure and protection which gives a security yet isolation

MAP 6 ZONING ADJACENT TO LANE COVE RIVER
Figtree Bridge to Fullers Bridge



KEY

- Open Space - Recreation
- Recreation - private
- County Open Space
- Industrial
- Special Uses
- Residential (with some roads not shown)
- County Road - proposed

The information on this map has been taken from the following planning schemes:

Willoughby - July, 1970
Amended July, 1982

Lane Cove - December, 1972
New plan is in preparation

Ryde - August, 1973

Hunters Hill - December, 1982

from suburbia and the pressures of the city which surround it. Vegetated valley sides and lack of built intrusions, particularly on the skyline, necessarily complement the topography to provide this style of environment, as in the Lane Cove River State Recreation Area (SRA).

Seeley (1973), points out that, for most categories of recreation, two aspects of the land are important - the quality of its landscapes or 'visual amenity' and its accessibility. This is amply demonstrated in a recreation demand study for the Lane Cove River SRA (Department of Lands, 1980) in which the "quiet and restful atmosphere" (25%) and "scenic and natural quality" (20%) were most highly rated by users as attracting them to the park. The next highest was "close to home" (15%)[1].

Both quality of landscape and accessibility (in the sense of nearness to population centres) are also characteristics of the river area downstream of the SRA and Fullers Bridge. There are more built intrusions into the landscape than in the SRA although their impact could be minimised and, in some cases, adapted to provide interest and variation in the landscape, rather than intrusion. Despite abuse and neglect, this section of the river retains a dominantly natural feel with a sense of enclosure, a character which alters dramatically below Figtree.

10.2 The Need for the Resource

Various authors and studies, both overseas and in Australia (ORRC 1962, Seeley 1973, Wellington Regional Planning Authority 1974, Sinden 1977, Mercer 1981), have detailed or projected the increases in outdoor recreation participation and demand over recent years and into the future. However, as Mercer has pointed out, there is enormous variation between the trends in particular activities and there are a number of difficulties in predicting future demand and participation rates. There is also some confusion between 'demand' and 'consumption', or participation, according to whether demand is defined as 'actual', that is, existing and exhibited demand, or 'latent', that is, the localised unsatisfied 'need' for particular types of outdoor recreation or facilities as yet unprovided (Mercer, 1977). This is compounded by the changes in 'demand' or participation which occur, for example, when new facilities are provided.

Whilst taking heed of these difficulties, a number of points can be made regarding the Lane Cove River Valley's position vis a vis recreational needs in Sydney. In general, participation in outdoor recreation is increasing at a rate above that of population increase and various studies indicate the strong trend towards increased participation in passive recreational pursuits such as picnicking, pleasure driving and sightseeing (Wellington Regional Authority 1974, Mercer 1977). These tend to be family oriented activities whereas the more active pursuits tend to be undertaken by younger people with friends.

The Lane Cove River SRA is a facility for such passive recreation of regional and city-wide significance. 49% of visitors come from 5 to 15km away with a further 21% from 15-25km and 16% from 25-65km, mainly from northern and western suburbs (Dept. of Lands, 1980). During the sample period of the SRA recreation demand study, April, 1979 to May, 1980, residents from all parts of Sydney, except Auburn, visited the park. It is noteworthy that quite high percentages of visitors came from Local Government Areas where other water-oriented and park recreation facilities were available or closer, particularly Hornsby (Ku-ring-gai Chase National Park) and Waringah (Ku-ring-gai Chase National Park and the northern beaches). Unfortunately the study did not probe the relationship between visitors' place of residence and their reasons for visiting Lane Cove SRA.

Allied with its wide geographical significance is the volume of visitation thus generated. Over the sample year 263,655 vehicles, with an average 4.22 persons/vehicle brought 1,114,627 visitors. With a developed area of 20ha, there were thus 55,731 visits/developed hectare of park. Whilst visitation is constantly high throughout the year, it varied from an average of 4,364 on a weekend day (maximum 8,911 in November) to an average of 1360 (maximum 3,800) visitors on a weekday. Thus the park is operating at saturation level, placing stress on its physical environment and producing traffic congestion, irritation and overcrowding for its patrons.

Thus there is obviously high demand, both actual and latent, for this type of environment for passive recreation. It could be assumed that there is at least some unsatisfied demand due to the disincentive for some people caused by the levels of overcrowding at weekends.

The 1980 demand study suggested three options for the SRA to cope with this demand: limiting visitation to a level consistent with the area's carrying capacity; developing additional areas within the park and promotion of substitute areas such as Davidson SRA. Limiting visitation for such an urban park is probably impractical and likely to be inequitable while the extent to which additional areas can be developed is severely

limited by the available reasonably flat land. Tunks Farm, near De Burghs Bridge, has been developed since the 1980 study and it is proposed to add to the Fuller Park area by extending further up Blue Gum Creek but further possible areas are scarce.

Promotion of substitute areas may divert some of the patronage, particularly those who perceive the overcrowding and for whom it detracts from their enjoyment. Davidson SRA may attract patrons from Warringah Shire which contributed the second greatest number of visitors (10.3%) but it is unlikely that those from Ryde (14.3%) or the Western Suburbs (17.9%) will be diverted to Davidson. Lane Cove is the most westerly of this type of environment and those from the western suburbs are unlikely to want to travel further if they are satisfied at Lane Cove whilst Ryde visitors would be likely to have a local loyalty to the park close to home. The 1980 study established that the park had built up a good clientele of regular users with weekly to monthly visitation by some users due to the convenience of the park's location. In addition, Davidson SRA is awkward to enter from the west and it lacks some of the qualities of Lane Cove River with traffic noise impact and less sense of enclosure.

Local parks with similar environments (water-oriented, relatively protected grassy flats with high quality natural backdrop) and facilities (barbeques, water and toilets, benches and tables) in nearby municipalities are receiving high levels of small group use[2]. To establish whether this represents, as some disgruntled locals would claim, a spillover from the SRA, or merely expression of local demand for this type of recreation, would require a survey of its own. However, it does support the contention that there is considerable demand for such recreation space provision.

In general terms, such recreation provision is the most equitable in providing for the widest cross-section of the community and the greatest number of people. It is also non-elitist in that the recreation requires very little financial outlay, particularly if public transport is available to the site, nor are any special skills required. In such environments as the Lane Cove River Valley there is potential for a variety of recreational activities from the passive picknicing, contemplation, reading and sunbaking to the more active boating, informal games (on the grassy flats), bushwalking/nature tracks (in the bushy backdrop), children's playgrounds, jogging and fitness tracks. Such space can thus be flexible and multi-purpose and provide for the needs of a great variety of people.

In addition, demand for this traditional type of recreation is unlikely to be a passing trend as in so many single sports or outdoor activities. The increasing use of the Lane Cove SRA reflects both increases in population and a current trend towards whole family activities outside the home. It could also be part of a trend identified by Hauser in an ORRC report (No.22, 1962) that, as the level of urbanisation in affluent countries rises there is a rapid rise in demand for recreation sites either within urban areas or very close to them, as compared to remote sites. Since his writing the increases in oil and petrol prices have made the remote sites even less accessible to a large number of people.

Whilst there is considerable opposition at local government level to the Department of Environment and Planning's efforts towards "urban consolidation", redevelopment of at least some parts of the lower North Shore towards greater density of population is probably inevitable. As the city grows it will provide not a substitute for the 'quarter acre block' fringe development required by young families but depth and variety in our provision of housing types close to the city. As the postwar population bulge ages, the demand from the middle-aged and elderly for such medium density housing types (smaller, less garden than houses, low maintenance) is likely to grow while problems of cost and time of journey to work may generate demand among younger families. If part of the object of urban consolidation is to increase densities in the inner and middle ring suburbs (and there is considerable debate over whether it can) then there will be even greater demand for recreation space of broad appeal in these suburbs.

The foregoing points establish a strong case for adequate development of the open space along the Lane Cove River to help provide for the present and future recreation demand of the surrounding, heavily urbanised areas. The remainder of this chapter examines the possibilities and constraints of various recreational activities. Chapter 11 refines this "shopping list" into the most appropriate or viable options, then examines how and where such development should take place as well as the administrative framework.

10.3 Possibilities and Constraints

Physically, the river valley from Figtree Bridge to Fullers Bridge is similar in nature to that of the SRA, that is, bushland covered sandstone slopes interspersed by river flats, but here the flats are more scattered or discrete and they are smaller. There are several sandy beaches between Stringybark Creek and Boronia Park and there are a number of areas of landfill which have been, or are being, developed for active

recreation. The major feature of this part of the river, however, is that it is lined with mangroves along most of both shores. This creates a landscape quite different to that either upstream or downstream of this section but also creates problems of access - the land and water are cut off from one another both physically and visually.

Car access to riverside areas is at present restricted to a few points and parking is limited in most places. However, a variety of recreational activities are possible along this section of river. The following section examines each of these in the current level of activity, its possibilities and its suitability from a number of viewpoints.

Bushwalking

A river valley track has a great attraction for bushwalking due to the variety of scenery which unfolds along its length. The middle Lane Cove valley has great potential to develop tracks on both sides of the river to link through the SRA to tracks in the upper catchment. With the available bridges in this stretch there is also great scope for shorter distance round trips. Such loop tracks are of great value to walkers with younger children (often somewat neglected in, for example, in National Parks), those with a short period of time to spare from city pressures or with problems of logistics in transport to and from the end points of the walk.

At present there are only three developed tracks in this section (Boronia Park to the Field of Mars, Blackman Park to Mars Road and River Avenue through Fairyland to Epping Road). There are some short access tracks and some very poorly defined and/or difficult to negotiate ad hoc tracks in other parts.

Picnic Areas and Associated Passive Recreation

The flatter foreshores of the middle river have been used for this traditional form of recreation since the 1880's (see Ch.7) but their use declined dramatically below Fullers Bridge after the opening of the Lane Cove National Park in 1938 and has not since been restimulated, with the exception of Fairyland's continued operation until the early 1970's.

On the whole, this section of river foreshores is not suitable for the large group picnicking, provided for in the SRA, due to the small size of the available river flats, problems of access and space for car parking. However, as organised groups amounted to only 15% of the SRA's visitation in 1979-80 (Dept. of Lands, 1980), the greatest need is in the provision for small informal groups. There are a number of smaller areas along the river suitable for development as smale scale picnic and passive recreation sites in the style of a number of Lane Cove Council parks, for example, Burns Bay Park, Tambourine Bay Park and Aquatic Reserve, Longueville. Suitability of some areas would depend on water access, both for visitors and for maintenance, due to the disturbance to the relatively small areas of bushland remaining which would be caused by establishing roads and parking.

Active Recreation

Active recreation is interpreted here in the traditional sense of team sports, athletics etc. There are at present a golf course, three developed sports field areas (Blackman Park, O.H. Reid Memorial Park and Mowbray Road Athletics Field) and one partially developed (the old Magdala Road tip) within the study section of valley. There are some further relatively flat sites along the river which could be developed for active recreation: between Stringybark Creek and Blackman Park, at the mouth of Kittys Creek, in Mowbray Park and the Buffalo Creek tip site.

The argument against active recreation in the valley does not rest on the need for, or use of, sports fields but on their inappropriateness in this location. Sports fields do not need a high quality natural backdrop, nor a waterfront location. Adequate perimeter landscaping can provide a sufficiently natural and pleasant setting for these activities wherever the fields are located. To use a river valley of high natural quality with high values for other activities is an inefficient, even wasteful, use of resources. In Melbourne, the report for proposed development of the Yarra Valley Metropolitan Park (Melbourne Metropolitan Board of Works, 1979) found public opinion overwhelmingly favoured passive rather than active recreation facilities in metropolitan parklands.

As long as a definite need for these fields exists, those already in the valley must be accepted although they could be better developed to encourage multipurpose and family use, for example, by provision of jogging and fitness tracks and imaginative childrens' play equipment. Since the establishment of the Metropolitan Waste Disposal Authority in the early 1970's, local councils no longer have to search for tip sites and this excuse for sports fields in the valley has also been removed.

Boating

The river is ideal for many forms of boating - canoeing, launch trips, rowing and use of small power craft, as well as some aquatic sports such as windsurfing in the more open reaches such as near Figtree Bridge. Its quiet waters are particularly suited to canoeing and rowing, being used by a number of canoe clubs as well as by rowing teams from the schools and universities[3]. It also experiences considerable use by waterskiers, which will be discussed separately later in this chapter.

The problems are mainly of access and conflicts between different forms of boating on the river. Access for cars and boats to the river is difficult - small boats may be launched at Linley Point but there is no ramp and car parking is now a considerable distance from the water access point. A combined Lane Cove Council - Public Works Department ramp was planned for here but was repudiated by the Council due to conflicts over waterskiing on the river. There are a few landing points up the river - Sugarloaf and the few small beaches, an old wharf near Stringybark Creek and one or two spots near River Avenue. These are quite undeveloped and used in an ad hoc fashion.

Conflicts have arisen in boating, mainly between waterskiing and other forms of boating, especially canoeing. Waterskiing also precludes other boating, for example, an application to run a boat hire service from Blackman Park was refused by the Maritime Services Board (MSB) on safety grounds and an application for a licence to teach windsurfing at Linley Point suffered the same fate.

Swimming

Despite shark attacks[4], the river has been popular for swimming. The Blue Hole near De Burghs Bridge was a favourite spot at the end of a long row as was the river in the Park especially as it was safe from sharks after the building of the weir. The Park Trust has been constantly worried about the state of the river, its pollution and consequent suitability for swimming.

Further down the river the Sydney Harbour Trust had estimated in 1910 the cost of bathing enclosures made of stakes and wire netting at Swaines Creek, Buffalo Creek and Swan's Picnic Grounds (Fairyland) along with dressing accommodation to be £50 each[5]. They did not proceed and the Swans later enclosed,for their patrons, an area on the river adjacent to Fairyland where there was a sandy beach. Later a pool area was enclosed off Boronia Park at the site of, and from the rubble of, the main northern sewer (NOOS) tunnel crossing which has now become an excellent silt trap and a mudflat at low tide.

Greasy mudflats lining the river and its pollution from the 1940's deterred most from swimming. The river is now quite clean and clear after a period of dry weather and is suitable for swimming. After wet weather, however, it is both turbid, which looks unpleasant, and contains sewerage overflows and stormwater discharge - not recommended for swimming.

There is now some use of the river for swimming such as from beaches where groups gather for waterskiing but it will remain a relatively minor activity as little can be done to ensure permanent high water quality (see Ch. 3.7) and our summer swimming period frequently has spells of wet weather.

Bike Riding

1. Trail Bikes Some of the area is currently being used by trail bikes, such as at Sugarloaf, particularly the flat riverside area and the sandy slopes of dredge material. The Lane Cove bank from Blackman Park to Stringybark Creek is another favoured trail bike route.

Essentially the remnant natural areas in this part of the valley are too small to support trail bike riding, from both the human and the ecological point of view. As small narrow areas, they are under considerable pressure from the surrounding urban areas (see Introduction) and the noise and damage caused by trail bikes is unacceptable in such areas. The small size of the bushland areas and the frequent narrowness of foreshore flat areas means trail bikes constitute a danger to other users (walkers, joggers) and generally impair the enjoyment of passive recreationists with noise, fumes and speed in a peaceful setting.

At present on Sugarloaf there is little ecological damage as they mainly use the old dredge works site but they have a nuisance value and provoke resident complaints. On the Lane Cove bank they affect few people at present but are causing environmental damage in gouging out wide tracks in the soft ground.

Unfortunately trail bikes can cause environmental damage and are not compatible with most forms of passive recreation. Thus they require either a separate area given to their use or very large natural areas where their dispersal limits their effects in one area.

2. Cycling Due to the high local relief of the ridge and valley topography of the north shore and the catchment surrounding the river, there are few places suitable for cycling in surrounding districts. As the early settlers found, the river provides direct flat access through this topography but flat foreshores for a land route are not continuous along the river. However, a cycle path through the valley could be developed to link from Hunters Hill to the SRA utilising the west bank as far as the footbridge and the east bank from the footbridge to Fullers Bridge (see Map 18). An east bank link from Blackman Park to join this path at the footbridge is also possible but may well meet resistance from Lane Cove Bushland and Conservation Society. A major, but not insuperable, problem with developing such a cycle route is the exact location of the route in the eastern part of Mowbray Park (see notes on Map 18).

Cyclists, especially older children and teenagers are particularly poorly served on the lower north shore with its rugged topography and preponderance of dangerous traffic arteries. These paths could provide an attractive cycle route and a safe link of easy grade between a considerable portion of residential area and the larger recreation grounds of the SRA.

Fishing

Fishing is very popular in Sydney waters and the Sydney estuary experiences the heaviest fishing pressure of any area in Australia (Henry, 1984). Both prawning and fishing are popular in the Lane Cove River and catch rates for fish in the river below Figtree are the second highest of any of the Sydney areas sampled by Henry. Catches are likely to be less prolific upstream of Boronia Park area above the truly estuarine environment (see discussion Ch. 6) but one of the most popular fishing spots on the river is in the vicinity of Figtree Bridge, especially on the upstream side, both from the Linley Point rockwall and from boats.

The vicinity of the cornflour mill was well known as a good fishing and prawning area up to the late 1930's due to the carbohydrate wastes put into the river by the mill. The pollution the river suffered from this time (see Ch. 3.7) caused fish kills and a decline in the use of the river for many recreational activities, including fishing.

Now, the study section of river is most suitable for the peaceful pastime of fishing and studies (Paxton and Collett 1973, Pulley 1977, 1980) show fish are available although limited in species. Problems can be interference and noise from waterski and other high speed power craft and shoreline access for those without boats, due to the mangrove growth.

Waterskiing

A major source of conflict on the river at present is over its use by waterskiers. Waterskiing is relatively recent (4-5 years) on the river, since the cessation of dredging and the institution of controls on pollution. Originating with some local residents, the number of skiers and boats has grown considerably with skiers from further afield learning of the area from the publicity over the conflict.

Areas suitable for waterskiing are quite limited within the urban area with the banning of skiing on Narrabeen Lakes, the tight controls on Manly Dam and the speed limits on many other sections of waterway. Thus the major waterski area for Sydney is the Hawkesbury River while in the future the Penrith Lakes Scheme will also provide for waterskiing.

On the Lane Cove River waterskiing has been predominantly from north of Kittys Creek to north of Linley Point, a total river length of 2,250m. Skiing is illegal under bridges and at Linley Point the channel is narrow and there are are often fishermen and other boats. Thus most of the boats turn in the wider section just upstream. There are, of course, the less considerate and self-disciplined who ski through the Linley Point area and under the bridge. North of the northern turning point the river is too narrow for skiing (Water Traffic Regulations). However, boats quite frequently go past this point, even as far as Fullers Bridge.

The skiers/aquaplaners base their day's activities at the beaches in this stretch of river - at Blackman Park and Lovetts Reserve and occasionally at some very small areas a little further upstream. Even the main beaches are small and quite narrow at high tide although they manage to accommodate the people associated with waterskiing on a peak day - up to 30 people on each of the main beaches (personal observation). Their main problem is

lack of direct car access and facilities of any sort. Litter can become quite a problem. There is some self-imposed regulation and tidying-up amongst some of the ski groups, especially those associated with the original Lane Cove skiers, but it is by no means universal.

Boat access is largely from below Figtree Bridge. The nearest launching sites for larger boats are Burns Bay Park (concrete ramp) or Woodford Bay (sand ramp) while lighter boats, not requiring a ramp, can be put into the water at Linley Point or Woolwich.

Safety and River Width The Hawkesbury River Study (Soros-Longworth and McKenzie, 1977) used criteria of 180m minimum river width for skiing where there are swimmers in the water and 120m minimum with no swimmers. This allows for the regulation clearances (MSB Water Traffic Regulations (NSW), Sec.6(3)&(4)) and 60m between two lines of boats travelling in opposite directions. Seeley (1973) quotes British minimum requirements as an unobstructured stretch of water of 550 to 620m long by 180m in width.

Most of the waterski section of river meets the 120m minimum requirement but very little meets the 180m requirement. There are 3 spots within the ski area, however, where the river narrows considerably - at the NOOS crossing (narrowest point 93m), at Sugarloaf (60m) and just north of Kittys Creek (73m)[6]. At these points boats towing skiers would need to travel single file only, in the centre of the river to conform to the regulations. In practice, this is rarely adhered to and as many as 3 boats have been seen to pass through the narrowest of these, at Sugarloaf, at one time with canoeists in close proximity (personal observation). This is a most dangerous spot as one of the two main waterski beaches, on Lovetts Reserve, is located just south, around a bend. Here there may be many children in the water associated with this waterski group (Photo 28). Boats travelling south through the Sugarloaf narrow thus have little time to avoid swimmers or a boat taking off from the beach. This problem is naturally exacerbated if the boat is travelling too close to the bank because of heavy traffic. Yet this narrow is the most heavily trafficked of the three due to its central location in the waterski belt. The Kittys Creek narrow is also heavily trafficked with two boats passing a common occurrence.

The problems of the safety of waterskiing on this river were highlighted by the death of a skier in February, 1984 who lost his grip on a turn and, being very close to the bank, was hurled onto a jetty and the rocks. This occurred in Cunninghams Reach where skiers generally turn in the apparently wider section of river a little upstream of Figtree. Local councils, particularly Lane Cove, have been attempting to have a speed limit imposed on the river for several years with no result. Following the death of the skier, apparent action was taken with the imposition of a 4 knot speed limit for a short stretch upstream from Figtree Bridge and north from Kittys Creek. However, this still permits waterskiing over most of the former waterski belt including two of the narrows.

Capacity of the River The total area of the stretch of water currently used for waterskiing is about 33ha. In an analysis of traffic density and river capacity the Hawkesbury River Study (Soros-Longworth and Mackenzie, 1977) found that average water area per boat in use was about 12ha per boat over the whole waterski belt. American leisure planning standards suggest 16ha per boat but, as this is for lakes or open bodies of water, it is probably too generous for confined rivers. 50% of waterski boats on the river are likely to be in use at any one time and the remainder beached.

From observations, comments of boat owners and theoretical analysis of maximum boat density, the level at which practical saturation occurs on the Hawkesbury River appears to be of the order of 1ha per boat locally and 5ha per boat over a whole reach. On this basis (5ha/boat), the peak capacity of the waterski reach of the Lane Cove is 6-7 boats in use. Observations[7] indicate that a level of 10-12 boats on the river associated with waterskiing or similar activities is frequently reached on fine warm weekends, with up to 8 boats in the water. At the same time there are likely to be a number of pleasure craft on the river ranging from Dad and the kids in a dinghy to groups of people on a cruiser.

At current levels of usage, the whole of this small stretch of river is frequently at peak capacity and dangerous situations arise[8]. There is no consistent policing (only occasional visits from the MSB patrol in a marked boat) or restrictions, apart from the self-regulating effects of congestion and the efforts of skiers interested in maintaining the viability of this waterski area by attempting to eliminate the irresponsible element.

The Impacts of Waterskiing On the **physical** environment the impact of watersking activities is probably relatively minor. The waterway is lined with mangroves which provide a buffer for those sections with soft banks and thus bank erosion is not a problem. Mangroves themselves do not like a high wave energy environment but boat wash from speedboats is generally at its worst at around 15kmph, well below cruising speed while the planing mode of modern speedboats results in little wash because the hull lifts out of the water (Soros - Longworth and Mckenzie, 1977). The only areas likely to suffer mangrove damage or undercutting of roots is where there are sharp turns in confined areas eg. the turning spot above Kittys Creek).

Mangroves can be severely affected by oil coating their pneumatophores and oil is unpleasant when it accumulates on beaches and along the river's edge. While speedboats do emit small amounts of oil, far greater amounts are likely to be found in the river as a result of illegal dumping of sump oil in stormwater drains or an oil spill in the Harbour near the mouth of the river (eg. in August, 1982 there was such a spill and large clumps of oil were observed on the shore on, and near, Sugarloaf).

Waterskiing does have an impact on water quality in the emission of hydrocarbon compounds and in the turbidity created. The water is now quite clear with dry weather but soon loses its early morning clarity with the activities of power boats and skiers. The toxic hydrocarbon emissions form an emulsion in the top 18" (.5m) of water and can effect plankton activity there. However, in general, newer and larger (and better tuned) engines are more efficient with lower emissions while the faster a boat travels the less hydrocarbons will be emitted. When skiing involves considerable stopping and starting, emissions and churning of the water (as well as effects on the banks) are likely to be high. On the other hand, when it is mainly high speed activity these effects are likely to be minimal. In the shallow Thirlmere Lakes, Horsefall (in prep.) has found only a small effect on water quality caused by power boats. As a deeper river, with tidal flushing, effects in the Lane Cove River may be even less.

Bird life may be disturbed by the noise if nesting in the mangroves along the waters edge but the major feeding grounds of the waders which are likely to nest and roost in the mangroves are in the vicinity of Figtree Bridge where power boats are transient. However, there are further shallows and feeding grounds at the NOOS crossing and in Buffalo Creek, both within the waterski belt.

Social impacts or conflicts associated with watersking are a much greater problem. As the Hawkesbury River Study points out:

> "Waterskiing, because of the high speeds involved and the space demanding manoevres of the boats and skiers, virtually precludes more passive activities such as swimming, canoeing, fishing and cruising. These latter users are subject to the discomfort of bow wakes and spray generated by skiers, as well as the danger of a collision with a ski boat or skier."

Noise from boating activity also creates a disturbance to people who live along the river with early morning and evening boating activities resulting in noise levels far in excess of the ambient level. On fine weekend days in summer power boat noise may be constant over 12 - 14 hours.

Waterskiing and high levels of power boating detract from the enjoyment of this area by other foreshore users for passive recreation, such as picnicking and bushwalking, particularly for those people (whom the SRA demand survey would suggest are high in number) who are seeking a high quality natural environment with a peaceful atmosphere.

Conclusions If waterskiing is to continue on the river it must be much more tightly controlled for safety reasons. These controls would include absolute restriction to two separate reaches centred on the two main beaches, so that no skiing occurs through the narrow sections, that is, from Blackman Park to Kittys Creek - a 775m reach or 10ha of water, and from Buffalo Creek to just north of the NOOS crossing - a 500m reach or 8 ha of water. There must also be insistence that boats and skiers adhere to water traffic regulations. This obviously requires a far more effective method of consistent policing or tightly organised skiing, as at Manly Dam. To allow other boating use of the river, time zoning should also be seriously considered such as has been instituted in England, for example, on the River Trent, where speedboats and waterskiing are restricted to two segments of river and then only at agreed times when relaxation of the normal speed limits is granted by the British Waterways Board (Seeley, 1973).

However, waterskiing is very demanding of water space compared with most other aquatic activities due not only to the total length from bow to skier (about 35m) but also to the necessity for sufficient area for skiing manoevres. It also alienates the nearby foreshore areas from activities which are incompatible with the level of noise generated by the speedboats. It must then be considered whether allocation of the river to waterskiing is justified. As previously discussed, this valley has a relatively natural bushland environment with high values for other recreational activities especially as it is located in the heart of the urban area.

Wilderness bushwalking is also a space demanding activity engaged in by a relatively small proportion of the population but it is not suggested that wilderness areas be provided in the centre of the urban area. Those who wish to enjoy wilderness must be prepared to travel some distance to suitable areas. A similar argument could be applied to waterskiing. That "metropolitan venues available to waterskiers are already severely limited"[19] should not necessarily mean that they must be made available and that the needs of others who live on, or wish to use, the Lane Cove River and its foreshores should be

sacrificed to that end.

On the 5ha/boat criterion, the two areas identified above for safe waterskiing conditions could only support 4 boats (2 in the water) each. However, this may be unnecessarily restrictive given that the theoretical analysis of maximum density by the Hawkesbury River Study indicates a maximum density of 1ha/boat, albeit under rigidly controlled conditions. A practical figure in this area is probably of the order of 3ha/boat so that the two areas could support a maximum total of 12 boats (only 6 in use). On present observations, 12 boats may be accompanied by 40 to 50 people.

If the waterskiing were controlled by a club with a booking system such that, for example, no one boat could use the area more than once per fortnight on summer weekend days, then the area could service the needs of a greater number of boats and skiers. However, such a system is probably impossible to institute or control given the physical nature of this ski area - an open river with no single point of access or base of activities.

Realistically, the decision does not centre around the issue of the closing down of the last available waterski venue in the metropolitan area but whether the allocation of this area for the use of only 12 boats and 40 people is an efficient and equitable use of a valuable natural resource in a highly built-up area.

Industrial Museum/Commercial Recreation Complex

Whilst there are various forms of industrial development along the study section of river, one of these could become an asset as an industrial museum area rather than an intrusion. There are two industrial sites where industry developed in an earlier period and which have thus displayed aspects of our industrial history.[10]

One is the former CSR factory site on Stringybark Creek. This site was first occupied by Cumberland Paper Mills, a large complex employing many people, which began operation in 1913 and ceased after a disastrous fire in 1928. It was leased in 1930 by Robert Corbett Pty Ltd, a firm which operated as merchant, importer and manufacturer of chemicals and pioneered the manufacture of acetic acid in Australia. However, due to objections to the odours of acetic acid production, the factory was forced to move several times before settling on the Lane Cove site. The buildings were rebuilt and became the south plant (south side of Stringybark Creek) and the property was actually purchased in 1938. The north plant was built during the war years as an acetone annexe but in the 1950's the factory could not keep up with the demand.

In 1952 Robert Corbett became a wholly owned subsidiary of CSR chemicals which expanded the northern plant but a continuing problem was the limitations imposed by the topography on expansion and development to cater for the most modern chemical processes and production was gradually taken over by CSR's Rhodes plant. The southern plant was closed in 1967 and the northern wound down from 1971, closing completely in 1978.

At this time the site had a number of buildings and items of industrial archaeological interest including several stone buildings, a large chimney and various devices associated with the dam.

However, the site was sold to S.C. Johnson in 1979 and, despite the efforts of Lane Cove Bushland and Conservation Society and other interested parties to promote the potential of the site for an industrial museum and recreation park, approval was given by Lane Cove Council in October, 1980[11] to a development application to build a polish canning plant and offices on the site. All buildings on the site were demolished in April, 1981 and all that remains of the site's history is the dam.

The second of the two sites is that of the flour mills adjacent to the Epping Road Bridge. Industry on this site dates back to the 1880's when Henry Whatmore and John Berry established a boiling down works on the site of the oldest of the present buildings adjacent to the footbridge (Maps 7 & 14). In the late 1880's the site was purchased by Clifford Love to build a cornflour factory. The locational advantages of the site were supplies of freshwater from the main crossing the river at this point and the river transport. The Chicago Starch Mills then started in November 1894 (Photo 9). In 1911 the separate flour businesses of Clifford Love and his son, Clifton, amalgamated to become Clifford Love and Co. Ltd and by 1925, the plant had grown considerably and incorporated a wet mill (Photo 13).

In 1966 an American firm, CPI International, envisaging Australia as an appropriate base for their branches in more politically sensitive Asian Countries, bought all the shares in the Lane Cove factory. In 1977 Fielders purchased a 49% share in the firm, which became Corn Products/Fielders Pty Ltd. Since 1925 the factory has grown even further to occupy most of the flat land between Epping Road and the river.

This factory is now an anachronism on this site, badly sited for an industry of this type. The original locational advantages no longer apply or make this site special while the site, once very isolated, is now surrounded by settlement in relatively close proximity. The grain fermentation processes produce noxious odours which, depending on wind direction, may blanket surrounding suburbs for several kilometres from the factory. The valley location means high level dispersion is difficult to achieve and the SPCC, in administering the Clean Air Act, has found considerable problems in attempting to eliminate the odour problem.

In their current state, the older buildings of the factory are a dilapidated industrial eyesore on a stretch of river of essentially natural appearance while its operation causes disturbance to the peaceful qualities of the rest of the valley through noise and odour. It is also likely that the older buildings would not conform with Building Ordinance 70 with regard to fire control and prevention.

The site is cut off from any possible expansion or development of associated industries by Epping Road, the river and steep topography along the river to the south. Yet this is an industrial site with a long history and unusual in having 90 year old buildings still standing. This building, if restored and the ugly additions around it removed, would provide an attractive and interesting piece of waterside scenery rather than a blight. It would seem a more appropriate and rational use of the site today to develop uses which give public access to the site and capitalise on its unique qualities, that is, its river frontage, a flat site on the river with a central hill allowing views over the site and the river, its main road location providing private and public transport, a footbridge link to the opposite bank recreation areas, and its natural surroundings.

This site would be an excellent location for an industrial museum cum commercial recreation site. Such a development would add considerably to the diversity of recreational opportunity along the river and for the northern and northwestern suburbs, as well as create a facility of historical and educational importance.

The site is currently zoned 4(b) Light Industrial in Willoughby Municipality. In the light of a Department of Environment and Planning (DEP) directive that industrial zones should not be reduced in Local Environmental Plans (to maintain employment), it may be difficult to achieve a change of zoning. However, an argument to justify a change of zoning could be made for a proposal which incorporated public uses of riverfront land and access to the river with uses which provide employment.

Proposals for this site are centred around retention of the historic industrial building on the site and development of commercial uses which will encourage public use of this area and awareness of its values and of nearby opportunities and activities developed within the valley. In summary, these consist of:

1. Retention and restoration of the historic waterfront building on the site (Photo 9) as an industrial museum including not only static displays but working processes from past eras. There should also be a significant section on the industrial history of the North Shore and, especially, of the Lane Cove River. Other aspects of the history of the River should also be included, for example, its history as a waterway and its environmental history.
   ol
2. Inclusion of a section on mangrove ecology, extending out into walks next to (and even boardwalks through) the mangroves on the site. Other aspects of the ecology and environment of the valley should also be included. Some of the buildings in the south part of the site may be able to be adapted to these purposes.

3. A family style restaurant (not take-away) on the central hill with wide decks to take advantage of the views for outdoor eating.

4. A more up market restaurant in the restored waterfront building to take advantage of the water and bushland views across to the lovely sandstone cliffs on the opposite bank.

5. Restoration of the former wharf for access to the complex by water.

6. The remainder of the site could then be developed continuing the museum theme with importation of objects, buildings machinery and processes from places where they have become obsolete, blocking modernisation, yet are worthy of preservation for our industrial heritage. The site would then become an historic park. Alternatively, individual commercial uses, preferably tourist or recreational could be developed within a total landscaped site. The first alternative would allow a more coordinated approach, be more suitable for such a contained site and be most desirable from educational, public interest and heritage points of view. It may then attract subsidies from various levels of government or perhaps become another extension of the

Powerhouse Museum.

Unfortunately, such proposals are unlikely to be realised due to the considerable, and recent, industrial capital investment in the site.

Other Uses

Two other uses which are often linked with recreation in natural areas are natural area preservation or conservation and educational uses.

1. Preservation/conservation The bushland and foreshores of the study area, despite their 'natural' appearance are greatly disturbed and altered. They have been fragmented, suffered great loss of plant and animal species and are still under great pressure due to the remnants' long narrow shape and the various intrusions into them. It would be farcical to reserve such altered areas in the heart of the city for natural area preservation which intrinsically limits recreational use to the lowest intensity forms.

On the other hand, conservation, management and careful planning can reduce pressure, regenerate and enhance the natural values while providing for the most efficient use of the resource for recreation in a natural setting. It is also likely that, if the area is planned as an important recreational zone, more money will be available for natural area control and management, both for initial work, for example, weeding and regeneration, and ongoing supervision and control.

2. Educational Uses The management of the Field of Mars Reserve is directed towards its use for environmental field study work although there are grassy slopes kept open for small scale picnicking, primarily by local residents and the visiting educational groups. The Ryde-Hunters Hill Flora and Fauna Preservation Society has, for some time, been attempting to have nearby Sugarloaf added to its area to complement the ecosystem types in the Reserve for field study work. There are a number of other areas between Fullers Bridge and Figtree Bridge suitable for environmental studies, that is, with a range and zonation in ecosystems, for example, Mowbray Park, the Kittys Creek area, Fairyland and the shore south of Stringybark Creek.

Educational uses and a number of types of recreational uses are quite compatible. Opening up of tracks for bushwalking would also facilitate access by educational groups. The suitable areas in the Field of Mars Reserve, in the Kittys Creek area and along the foreshore south of Stringybark Creek are accessible at present but the vague tracks in other areas would deter all but the most intrepid teachers.

There is an unfortunate tendency in planning studies and plans of management, when an area looks natural, to want to retain it for 'ecological purposes', 'habitat' and 'nature study'[12] rather than seriously investigating how 'natural' it is and how important it is in wider contexts for various purposes. Nor are the ways in which multiple use can effect a better use of the available resource, yet retain conservation objectives, investigated. As much weighting could be given, in this study area, to the importance of the bushland and foreshores as a recreation habitat for people as to its importance as a habitat for wildlife.

To conclude: the remnant natural areas along the river in the middle Lane Cove River Valley constitute a high quality resource for individual and small group recreation, that is, walking, cycling, picnicking, boating, and for educational purposes. Multi-purpose development of existing active recreation areas could also widen the scope of available activities without further encroaching on scarce bushland. The type of environment the valley provides is relatively scarce yet in high demand, as the use of the State Recreation Area upstream demonstrates. In the heart of a densely populated urban area, this resource must be efficiently used with regeneration where necessary and adequate integrated development to allow its enjoyment by the communities which surround it.

Notes and References

1. These answers were in a structured checklist and the components of the attractions were not explored.

2. Local observation, only partly personal.

3. St Ignatius College, Riverview and St Josephs College, Hunters Hill, the Macquarie University and Sydney University Rowing Clubs (based at Tambourine Bay and Linley Park) and the North Shore Rowing Club.

4. A 20 year old died in 1901 before he could reach North Shore Cottage Hospital with his left leg bitten off below the knee when swimming in the river 'at the orchards nearby Mowbray Road' (on the opposite bank) (Plummer Vol. 48, p.15). The last fatal attack was in 1917 (Pratt, 1980).

5. Sydney Harbour Trust Letterbook A06/5071.

6. Measured from MSB hydrographic survey maps. Mangrove growth since the map outlines were drawn may have narrowed the river in parts. Lane Cove Council claims several spots less than 60m in this stretch.

7. Without aerial photos, as used by the Hawkesbury Study, accuracy in ground observation is difficult to obtain with the limited access and viewpoints on this river.

8. Apart from those previously mentioned in regard to narrow sections, other incidents arise through the density of boats lack of regard for the rules and of the needs of other boat users. At least 2 incidents arising from purely irresponsible behaviour towards canoeists have been reported to the MSB from (i) the Macquarie University Rowing Club, letter of 4.3.82 reporting an incident of 14.2.82, and (ii) Wakehurst Touring Canoeists - interview at MSB on 5.9.80 regarding incident of 8.6.80, File 80/19160.

9. Letter from the office of the Ombudsman to Lane Cove Municipal Council, 12.1.83 on Council's complaint about the conduct of the MSB re waterskiing activity on the river.

10. Source for following history: Lane Cove Library Local History Section.

11. Lane Cove Council did not necessarily favour an industrial use over a museum/park use but approval had to be given to a legitimate development in an industrial zone although conditions of landscaping, foreshore dedication etc were imposed.

12. For example, Lane Cove SRA Plan of Management, First Draft, by MSJ Keyes Young Planners. A recent example of such preservationist thinking inappropriately applied to fragments of urban bushland is the concept of setting aside of undisturbed core areas in each urban reserve with only the buffer zones available for use (Schoer, 1984).

CHAPTER 11

PLANNING FOR THE VALLEY

The foregoing sections point inevitably towards an optimum plan for the future of the section of the Lane Cove River Valley under study. The aim of this chapter is to outline such a plan, physical and administrative, including some of the problems inherent in the political and administrative realities impinging on the valley.

This does not pretend to be a detailed plan of management but a consideration of the conceptual framework and guidelines for setting up such a plan. It is based on the following principles:

1. The importance of the whole Lane Cove River foreshores and bushland from Figtree Bridge to the source as a conservation greenway and for recreation in a natural setting, particularly considering its strategic location for so many urban dwellers.

2. That the valley and the river be regarded as an integrated whole rather than the outer edge of various municipalities. To this end the most important recommendation of this study, and the principle on which all planning for the valley must rest, is that a regional plan must be drawn up for the valley under the provisions of the Environmental Planning and Assessment Act, Sections 40-52. All bodies, authorities and levels of government must work within this plan and further ad hoc developments within the valley should not take place as these preclude alternatives and carry their own momentum for the direction of development.

3. The Figtree to Fullers Bridge area should be developed for efficient resource use, that is, to make maximum use of the particular advantages and qualities of this area consistent with conservation and protection of natural values. Activities which may detract from natural values and do not require, or cannot capitalise on, the particular qualities of the area, should be excluded.

4. That, wherever possible, diversity of recreational opportunity should be provided such that they complement other facilities and opportunities in surrounding municipalities.

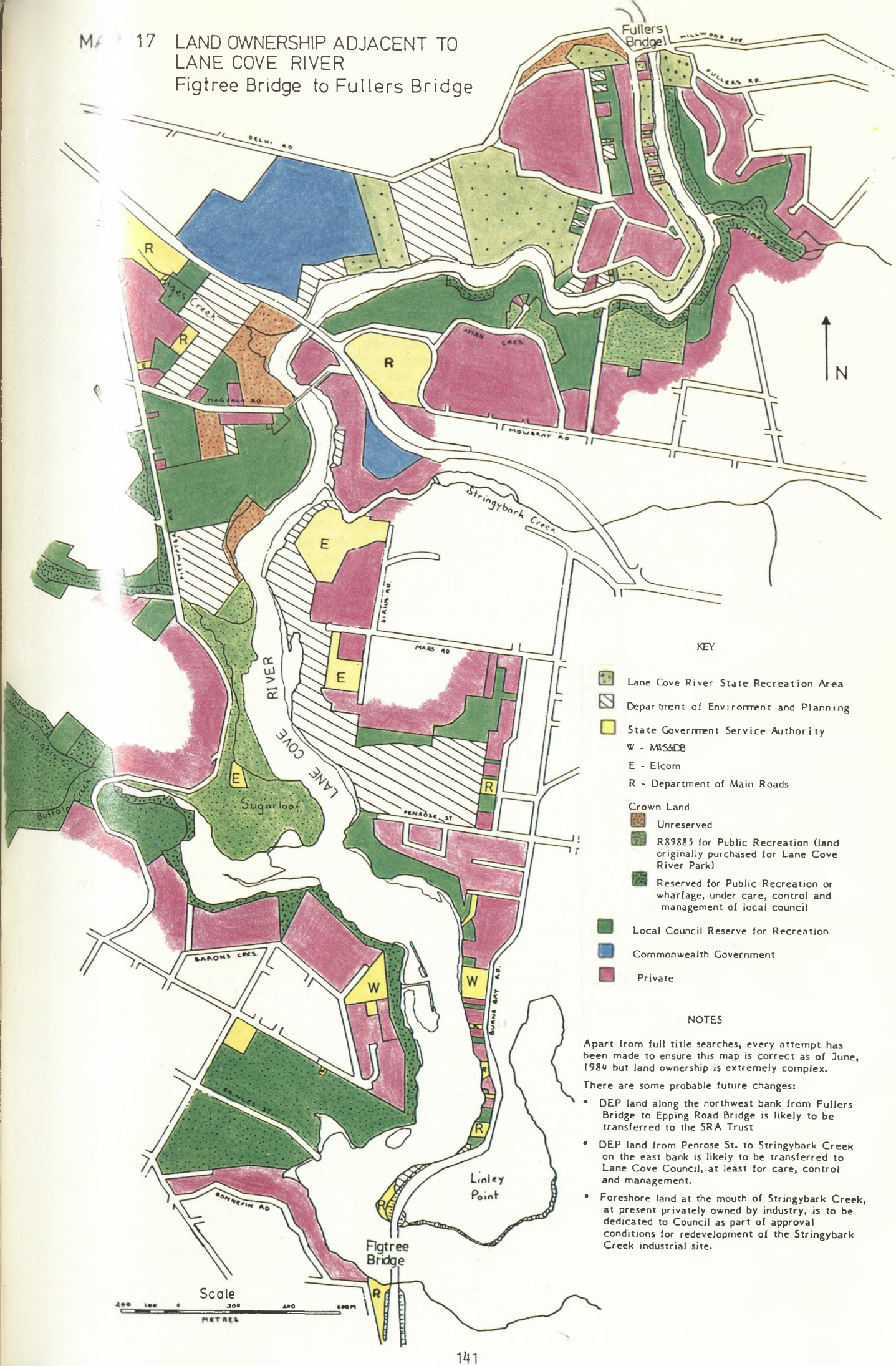
11.1 Greenways

There are many examples elsewhere of the establishment of water-oriented greenways or linear parks along rivers. These are corridors of variable width along a river, oriented to natural features and vegetation, developed for public use and enjoyment. In the United States, along with the push to reduce pollution of the rivers, have come moves to make better use of waterfront land for public enjoyment, to revitalise decayed waterfront areas and, often, to take the opportunity to make the waterway a focus for the city in a park/business complex. Thus, in the United States, greenway developments vary from relatively narrow corridors over as little as a mile in downtown areas with riverside vegetation and paths to which shopping, entertainment and other downtown functions are oriented such as the San Antonio River Walk, Texas, to suburban greenways including a pedestrian bikeway such as on the Huron River in Ann Arbor, Michigan. They also include Maine's 150 mile long Saco River Corridor which includes 20 towns and 3 counties (U.S. Environmental Protection Agency, 1977). In Canada, the Trent-Severn-Rideau Waterway corridor in Ontario extends 425 miles and includes urban and rural landscapes and historic sites (Gunn, 1977).

In Australia, the Lane Cove National Park was an early example of such a concept. There are also recent examples of the application of the greenway concept, notably in Victoria with the proposals for the Yarra Valley Metropolitan Park (Melbourne Metropolitan Board of Works, 1979) and for a smaller linear park along Koonung Creek, a tributary of the Yarra, a small park which will link to the Metropolitan Park (Niran, 1980).

Such greenway developments frequently involve tremendous problems in co-ordination and cooperation of a great variety of parties concerned, from landowners and government bodies to interested community groups and business people. In the United States considerable thought has been given to how to work through these problems (Texas A & M University 1974, U.S. EPA 1977, Gunn 1977). These studies, and experience, indicate that, given effective leadership, sufficient funding and community involvement in planning and implementation, collaborative management is both possible and successful.

MAP 17 LAND OWNERSHIP ADJACENT TO LANE COVE RIVER
Figtree Bridge to Fullers Bridge



KEY

- Lane Cove River State Recreation Area
- Department of Environment and Planning
- State Government Service Authority
  - W - MWS&DB
  - E - Elcom
  - R - Department of Main Roads
- Crown Land
  - Unreserved
  - R89885 for Public Recreation (land originally purchased for Lane Cove River Park)
  - Reserved for Public Recreation or wharfage, under care, control and management of local council
- Local Council Reserve for Recreation
- Commonwealth Government
- Private

NOTES

Apart from full title searches, every attempt has been made to ensure this map is correct as of June, 1984 but land ownership is extremely complex.

There are some probable future changes:

* DEP land along the northwest bank from Fullers Bridge to Epping Road Bridge is likely to be transferred to the SRA Trust
* DEP land from Penrose St. to Stringybark Creek on the east bank is likely to be transferred to Lane Cove Council, at least for care, control and management.
* Foreshore land at the mouth of Stringybark Creek, at present privately owned by industry, is to be dedicated to Council as part of approval conditions for redevelopment of the Stringybark Creek industrial site.

Along the study section of the Lane Cove River the task is less arduous than in many other situations in that much of the land is already zoned 'open space' (Map 16) and there are few private landowners although there are some industrial and service incursions (Map 17). However, it is imperative that the foreshores and bushland adjacent to the river be accepted as a continuous linear resource requiring the setting of overall goals and objectives and the development of a plan which considers this area as a greenway development to link with the SRA, not as isolated pockets of bushland which happen to be on a river.

In NSW the mechanism to achieve such coordination, apart from putting the river and all the bushland and park areas under the management of one body, is through a regional plan.

Aside from the political problems in putting these areas under one body, a regional plan has the advantage of being able to include the wider area of the catchment within its management policies. It can thus include general management guidelines for other bushland in the catchment and controls on development outside the bush or park areas which may impinge on them or the river. Problems such as the excessive flow of sediment from building blocks, contributing to what has always been a major problem of the river, may be more effectively controlled. More importantly, the design and siting of any further roads and subdivision should be required to consider their impact in disturbance of bushland downslope and prevention of erosion and silt contribution. Skyline developments may also be prevented or rigorously controlled.

11.2 The Importance of a Regional Plan

At present the management, where there is any, of the Lane Cove River Valley is very ad hoc, fragmented and too dependent on political whim, the strength of local conservation group pressure or the availability of individual expertise within varied organisations. With so many government bodies having a stake in the valley and conservation groups lobbying and pressuring any relevant authority, Minister and their local council on management issues related to their particular chunks of bushland, it is inevitable that such fragmentation should occur.

Two recent examples of a lack of holistic perspective are a riverside grandstand proposed for the Mowbray Road Athletics Field and a walking track up the valley including boardwalks through the mangroves of Buffalo Creek proposed to be constructed by the Union of Lane Cove Valley Conservationists under the Community Youth Employment Programme. The grandstand would have seriously impaired the visual amenity of one of the most natural-looking stretches of river between Figtree and the Fiddens Wharf area, its back rising above, and extending out over, the mangroves, an aspect completely ignored by the superficial Environmental Impact Assessment on display with the plans. Yet, without considerable local protest, it may well have received approval as the proposal was rumoured to be backed by the personal interest of a segment of the Department of Environment and Planning (DEP). The walking track and boardwalks proposal was also planned in isolation from other considerations of planning for the valley, particularly freeway alternatives but was shelved in favour of a track project further up the valley with less physical problems.

Yet another, longstanding and continuing example of the propensity of local councils to view proposed developments only from their sides, rather than from the water and the other side of the river as well, is the Lane Cove industrial area. Along a waterway of substantially natural appearance, this ridgeline series of unattractive block style factory buildings forms the greatest intrusion, detracting considerably from the amenity of the valley. They are extremely obtrusive from many viewpoints on the river and the opposite shore from above the footbridge at Magdala Road to the Boronia Park Walk south of Buffalo Creek (Photos 12 and 14).

Their appearance from these viewpoints has obviously never been considered either in the design and siting of the buildings or in terms of landscaping. In the Lane Cove Municipality, landscape plans have been demanded for every commercial and industrial development for many years yet, even for developments recently approved (Photo 14), their appropriateness in the industrial area is still only considered in terms of proportion of total site area and the view from the street. For a council which prides itself on its environmental orientation, its record on the view from the water is abysmal. (Aside from the industrial area, this council has also allowed a number of high rise developments to dominate the skyline a little further downstream. If consideration was given to the view from the water and the opposite shore at least some of these factories could be simply and relatively effectively screened. In the context of a regional plan setting goals with community support, such screen planting of the older factory buildings should be able to be carried out.

The valley is physically and visually a single entity. A development which one

council allows on its shores, slopes or valley skyline is viewed from the river and the opposite shore and must be considered in the context of the valley rather than just the context of the municipality.

Likewise, different objectives of each council or government body for use of their bushland or section of shoreline can result in great discontinuity in what is a continuous resource. A regional plan could change the parochial orientation of present management and develop policies for the whole valley as well as frame a more detailed plan which considers the implications of management and development of the foreshores from a whole valley point of view.

The exact nature of a regional plan is not defined under the Environmental Planning and Assessment Act. It may merely lay guidelines for management and decision-making and matters which must be given proper consideration, or it may be more prescriptive and zone areas where certain uses are permitted or prohibited. However, its importance lies in the degree to which it can be developed with public input and comment and that, with the power of law behind it, in the absence of a single managing authority, it can act as the integrating force for the valley.

The Union of Lane Cove Valley Conservationists has submitted to the DEP a document which they wish to have accepted as a State Environmental Planning Policy relating to the management and protection of all bushland and disturbed bushland in the Lane Cove River Valley catchment (ULCVC, 1983). Whilst not a regional plan, this document does take a broad, whole valley viewpoint. Within the City Northern Subregion section of the DEP the development of a regional plan for the Lane Cove Valley is considered important and a brief was drawn up to examine the current state and future management of the open space in the valley'. However, in the context of limited finances and manpower, other tasks proved to be of much higher priority and higher political profile. Little was seen to be gained for a Labour government in such staunchly Liberal seats and the project has been shelved along with the Union document which would require assessment within such an overall plan. It is now up to local groups to make it a high profile issue. For those wishing to preserve what remains in the valley and to oppose the freeway continuation, the drawing up of a regional plan and the development of community use of the area, has some urgency.

11.3 Proposals for the Figtree to Fullers Bridge Section

The Lane Cove River now passes through four environments of different character (see Introduction), three of which can be recognised as different parts of a local and one-day recreation resource for metropolitan Sydney while the fourth is settled. Each of the three divisions suited to recreation offers different qualities and scenery and they are best suited to different styles of recreation.

Recreation styles and opportunities in Zones 1 and 2, above Fullers Bridge have been determined by their nature and their past development which the Plan of Management for the SRA (1983) sets out as:

Zone 1 - "untouched natural bushland with low key recreational activities centred on walking"

Zone 2 - "intensive day tripper auto access picnic area for metropolitan Sydney"

The first draft plan for the SRA included the third zone, below Fullers Bridge (MSJ Keyes Young, 1983) and classified its place as "river-oriented natural bushland for non-intensive recreational and educational activities" and included zoning of the available areas into:

(i) 'protected areas' - Mowbray Park, parts of Field of Mars and Sugarloaf, flats between Stringybark Creek and Blackman Park, Pages Creek area, for habitat and field study purposes.

(ii) non-intensive, pedestrian access recreation.

It also specified perimeter parking, water access, walkway network, minimal facilities and prohibition of power vehicles.

However, according to the findings of this study, such a plan does not represent the most efficient or the most appropriate use of the resource. With such small narrow areas under such pressure and having undergone such change, it is most doubtful that strict preservation or protection is appropriate except, perhaps, for the high part of Sugarloaf. For example, the Pages Creek area which is recommended as a protected zone, perhaps with restricted access, is highly weed infested along the creek beyond the reed beds and on parts of the southern slopes (also once cleared), has a high voltage transmission line tower within it and a gas pipeline through it. Depending on the managing authority and the money available for weed eradication and regeneration, 'protection' is more likely to mean 'neglect' and these areas are too small and too close to settlement to look after themselves. The ducks which use the reed beds are unlikely to be affected by appropriate human use of nearby bushland.

Non-intensive recreation, centred on walking only, does not take full advantage of the particular qualities of this stretch of river, nor does it provide for the greatest recreational needs of the many people who live close by this part of the valley. It is important not to tie up this resource in a form of recreation which a relatively small number of people enjoy when its role should be to provide recreation space and enjoyment for many. Planning for the valley must consider both these factors (qualities of the river valley and recreational needs) within a framework of the foreshores as a continuous linear resource linked by the river, rather than as fragmented chunks of bushland.

The Proposals

1. A **walking track system** and **cycleway** which links all of this section of the valley together and to the SRA and the valley beyond (Map 18). Thus the foreshores will be linked on land and by water. The proposals shown link existing well made walking tracks and existing, but poorly defined tracks, with additional tracks to provide an integrated system with many possibilities for short or long loop walks. Further notes on the cycleway are given with the map. There is no cycleway shown on the map on the Lane Cove bank but it would service a much greater population if it was extended from the footbridge to Blackman Park along the track route shown. However, Lane Cove Bushland and Conservation Society (LCB&CS) are known to oppose cycleways in this area (submission to Council on the Stringybark Creek Study (Howard and Associates, 1981)).

2. **Regeneration** of degraded and weed infested bushland and associated sites. This is an important adjunt to the development of the walking track system.

3. A series of **small scale picnic areas** on suitable river flats with small landings or beaches so that they are accessible by boat (Map 18). By land some would be accessible by car and others only on foot. At present, the greatest demand is for picnic areas accessible by car although, should boating activities on the river be encouraged further, those accessible by boat could become popular again.

a) **Car access picnic areas** These would be of the style/scope such as that already developed at Linley Point and other waterside areas of Lane Cove on the lower river. These areas would include the end of Princes Street-Tipperary Falls area of Boronia Park, possibly the Sugarloaf flat, Blackman Park, Buffalo Creek tip and the River Avenue-Quebec Road frontages. Eventually the area on Reid Drive should be included (area now leased by golf club). Some picnic area space could also be developed in conjunction with the Athletics Field, at the Magdala Road tip active recreation area both not shown on map). The mouth of Kittys Creek (north side) is also a possible site. All of these sites already have road access although the Kittys Creek road is not tarred, is badly deteriorated and closed. All are sites of past disturbance and, except for the areas in Boronia Park, of filling.

   The already developed Linley Point is an attractive and popular spot. It is well-known due to its visibility from Figtree Bridge and its reputation as a good fishing spot. It is a visually interesting location with fishing and other boats, wading birds on the mudflats and the contrast of distant bustle on the bridge with the peacefulness of the riverside. Likewise the end of Princes Street, the site of the former wharf on the opposite bank, is also popular although here, at present, people can only contemplate the scenery from their cars.

   Blackman Park has also been developed and has the advantage of toilet facilities. However, the site design thus far, despite the attractive bushland 'bowl' setting is quite unimaginitive and does not allow adequate river access or river views for picnickers nor provide for multiple use of the setting. The Athletics Field has been developed only for active recreation and the former Magdala Road tip, 11 years after its closure had development begin only in January, 1984. Some of the other areas such as the Tipperary Falls area in Boronia Park, Sugarloaf and River Avenue are used to some degree for recreation but require good site design and development. The first is a particularly degraded site at present.

b) **Boat and foot access picnic areas** Lovetts Reserve beach, part of the shore between Blackman Park and Stringybark Creek, Fairyland frontage, part of Mowbray Park foreshore, on the south bank of Stringybark Creek and Kittys Creek mouth (north side only) and Sugarloaf point (if not developed for car access) are suitable sites. Of these, only Sugarloaf point, Fairyland and Kittys Creek are easily accessible at present and none of the sites are developed at all. Without car access and parking, such areas need only the access and landing place, small areas of grassy bank with river views and, preferably, a policy of 'pack in, pack out' for litter.

Planning of all these picnic sites should, as far as possible, be co-ordinated so that they provide some range of facilities. Some of the car access sites may have barbeques and toilets, some may not. Some may include children's play equipment or other

appropriate extensions of the passive recreation theme. As a larger and flatter site, Buffalo Creek has the potential to include a variety of facilities and activities.

4. **Multiple use of the active recreation areas,** Blackman Park, Magdala Road and the Athletics Field. These areas have been filled, their naturalness destroyed and active recreation fields created, providing for one aspect of recreation. However, it is important that these areas be more imaginatively developed for multiple use with, for example, good (not token) children's play equipment, adequate tree planting and edge landscaping, jogging and fitness tracks, tennis practice wall(s) and, where appropriate or possible, riverside picnic zones and small BMX bike areas.

Such multiple use adds to the diversity of recreational opportunity and thereby encourages family use of these areas. Some team sports are experiencing a decline in support as family-oriented activities increase. If active recreation areas provide opportunities for various members of the family, they are more likely to support weekend sport and make it a family outing. It also represents a more efficient use of resources particularly where the fields are located on the river foreshores in a valley of high natural values.

5. Development of **boating and aquatic activities.** Linley Point, Blackman Park and the south side of Sugarloaf are excellent locations for the development of activities such as canoeing, row boats, windsurfing and paddleboats. Franchises or licences to hire out the equipment and to teach, for example, windsurfing could be let and these locations have access, beaches and are located on the wider basins in the river. At present the waterskiing precludes development of these activities but has considerable safety problems. As the other forms of boating are also likely to cater for a wider range, and greater number, of people, are more compatible with birdlife and more complementary to other forms of passive recreation in the valley, the waterskiing should be excluded.

6. Development of the cornflour mill site for an industrial museum - commercial recreation complex as described in Chapter 10.3.9.

7. Development of a system of **public water transport.** The SRA Outdoor Recreation Demand Study (Department of Lands, 1980) found relatively low visitation from central and inner Western Sydney suburbs considering their relative proximity but commented that this may be due to "the lack of public transport to the park and the subsequent need for personal vehicular transportation". These suburbs support dense populations with a relative lack of open space (NSW Planning and Environment Commission, 1975) especially of this style of recreation space. Ferry services from the Quay, or from a closer wharf served by a regular service terminating in the SRA below the weir would do much to provide recreational opportunities for those least served at present.

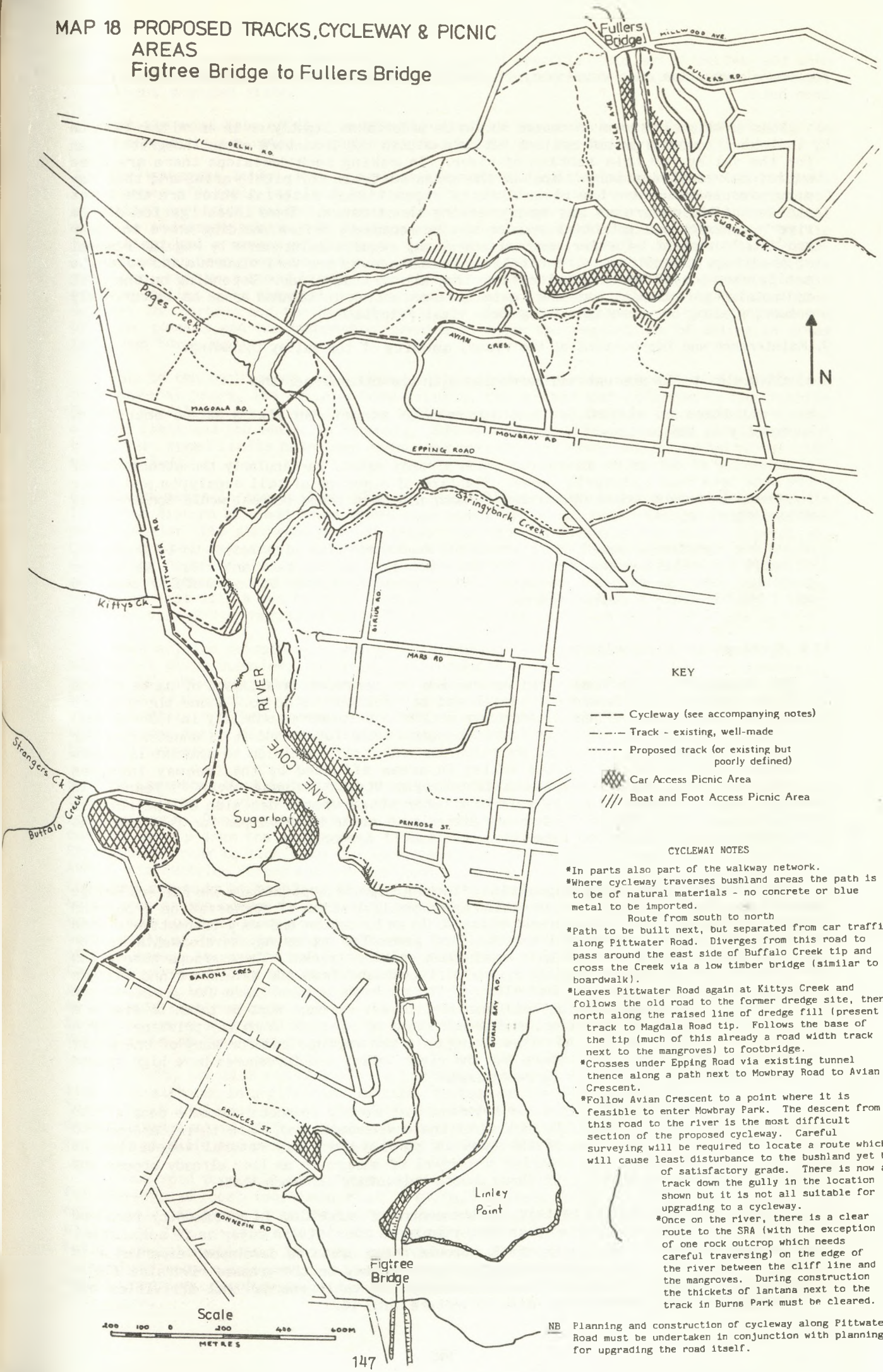
Such a service would be by launch or small cruiser, operating mainly at weekends and on public holidays and perhaps operating more of a tourist, sightseeing trip during the week. At present Pier One Cruises often include the river to the footbridge as part of their tourist harbour trips on a 60' catamaran-hulled cruiser, especially if the harbour is rough or windy, and patrons are generally most impressed with the existence of an area of such natural appearance so close to the city[2].

8. Development of picnic sites must be accompanied by some **small scale clearance of mangroves.** The river edge is a most important part of recreational enjoyment and its value as human habitat in this location is probably greater than the narrow mangrove belt for fish, bird or invertebrate life. Chapter 6 clearly demonstrates that there is little justification for maintenance of the almost continuous fringe of mangroves along the river from Figtree to Fullers Bridge. They did not exist along the river at the time of white settlement nor do they have the degree of biological importance which mangroves elsewhere, and even below Figtree Bridge, may have. However, knowledge of mangrove functions and estuarine/ riverine ecology is sufficiently incomplete to warrant great care being taken, to proceed slowly and assess effects and to clear only small segments of the fringe belt where needed under the provisions of a total, co-ordinated plan for the valley.

Clearance of patches at selected locations (mainly picnic and boating areas) can serve several functions. It would allow access to the river, both physically for those wishing to use the river or its edge, and visually for those using the foreshores for picnics, walks etc. It would also restore some of the scenic variety of a trip up the river yet allow human and ecological uses to co-exist.

Serious consideration could also be given to the concept of replacing some sections of mangroves with the original waterside vegetation of melaleucas, casuarinas, grass and reed swamps in some places and exposuring the rocky slopes and dry sclerophyll forest in other places. This could be done in conjunction with the above particularly to investigate the long-term viability of this older shoreline vegetation under present conditions. To restore some of the river's former visual and waterside ecological variety would also serve educational purposes in enabling a more accurate view of how the river and its

MAP 18 PROPOSED TRACKS, CYCLEWAY & PICNIC AREAS
Figtree Bridge to Fullers Bridge



KEY

- Cycleway (see accompanying notes)
- Track - existing, well-made
- Proposed track (or existing but poorly defined)
- Car Access Picnic Area
- Boat and Foot Access Picnic Area

CYCLEWAY NOTES

*In parts also part of the walkway network.
*Where cycleway traverses bushland areas the path is to be of natural materials - no concrete or blue metal to be imported.

Route from south to north

*Path to be built next, but separated from car traffic along Pittwater Road. Diverges from this road to pass around the east side of Buffalo Creek tip and cross the Creek via a low timber bridge (similar to boardwalk).
*Leaves Pittwater Road again at Kittys Creek and follows the old road to the former dredge site, then north along the raised line of dredge fill (present track to Magdala Road tip. Follows the base of the tip (much of this already a road width track next to the mangroves) to footbridge.
*Crosses under Epping Road via existing tunnel thence along a path next to Mowbray Road to Avian Crescent.
*Follow Avian Crescent to a point where it is feasible to enter Mowbray Park. The descent from this road to the river is the most difficult section of the proposed cycleway. Careful surveying will be required to locate a route which will cause least disturbance to the bushland yet be of satisfactory grade. There is now a track down the gully in the location shown but it is not all suitable for upgrading to a cycleway.
*Once on the river, there is a clear route to the SRA (with the exception of one rock outcrop which needs careful traversing) on the edge of the river between the cliff line and the mangroves. During construction the thickets of lantana next to the track in Burns Park must be cleared.

NB Planning and construction of cycleway along Pittwater Road must be undertaken in conjunction with planning for upgrading the road itself.

foreshore vegetation once developed, its use by Aborigines and the range of ecosystems it once held.

None of this clearance or change should be undertaken lightly or in an ad hoc fashion by individual councils or authorities but only within the framework of an integrated plan for the valley, or this section of river. In making such decisions there are some additional considerations. Most of the areas suitable for picnic areas and thus for mangrove clearance are the river flats of depositional material which are the least stable and the mangroves may be protecting these banks. Some investigation of the river's dynamics and potential erosion may be necessary before deciding where to clear and what to replant. Further, such clearance may require maintenance by regular removal of seedlings attempting to recolonise. The mangroves are very vigorous and colonise easily when conditions are suitable as they are in this river. Depending on the silt and nutrients available, they may quickly re-establish in cleared areas as is currently occurring along the frontage of the once vital Fairyland.

9. Maintenance and improvement of the **visual amenity** of the valley including:

a) all design to complement and harmonise with the natural setting.

b) prohibition or strict design controls on structures likely to be obtrusive, especially on the skyline.

c) screening of obtrusive structures which already exist, particularly the structures of the Lane Cove West industrial area. Planting of a screen of tall eucalypts and other intermediate height trees or shrubs (it need not be a dense screen) would considerably reduce their impact.

d) no new structures, apart from wharfs and boatsheds (for hire boats) to be built on, or near, the waters edge. Necessary structures to be set back and blend, as far as possible, into the bushland backdrop. Wharves and boatsheds to be carefully designed and sited for minimum obtrusiveness.

11.4 Problems and Difficulties

1. **The freeway reservation.** This reservation has hampered development of parts of the valley in the past but should not be allowed to continue to do so. Under the present government, construction of the freeway may well be a stronger possibility in 1984-85 than it has been previously but it is at least 10 years in the future and it is unnecessary for the land to lie neglected until construction, or a definite decision to abandon is taken. The development envisaged for the valley in areas affected by the freeway involves sufficiently small scale investment as to repay itself in usage over 15 years. In addition, some segments could be left to a later stage when a decision on the road is clearer. For example, Kittys Creek mouth picnic area could be developed for foot and boat access initially and up-graded later to car access if appropriate.

2. **Local conservation group opposition.** These groups, except perhaps the Fullers Bridge Association which has a wider foundation as an amalgamation of conservation group and progress association, are very preservationist in orientation and very protective of the bushland within their sphere of interest. They generally oppose any developments in, or likely to impinge on, this bushland, apart from walking tracks. These groups have often been responsible for saving our last remnants of bushland from the developers and fillers and have done much to promote the values of the much abused and taken for granted bush through the community and within their councils. However, care must be taken to strike a balanced view between conservation, and preservation of what is in no way pristine, for a minority use. Preservation and bushwalking only are appropriate for many of the gully bushland remnants of the north shore but the river valley and foreshores have high values for other activities which must be recognised.

Conservation groups may argue, or believe, that merely to encourage more people into the valley will cause further degradation of the environment and, with their tendency to regard the current structure of the bush as absolute and all natural vegetation as absolutely good, to oppose any clearing or control of mangroves as they already oppose any use of fire in urban bushland. On these points this study contends that:

a) a natural environment such as this, in the centre of suburbia, is a community resource and should be made available to as many people as possible to enjoy as is consistent with conservation of that environment. Should these areas be developed, experience in other similar areas shows that the majority will stay on the grassed riverside flats. The bushland slopes provide a natural backdrop for their recreational activities but the majority do not necessarily wish to venture into it.

b) control and management under a plan with agreed specific aims and objectives and with funds for development and regeneration will improve the natural values well above their current degraded state.

c) that the role both of fire in the structure of the bush and of mangroves along the river must be evaluated in much broader contexts than has hitherto been the case.

3. **The waterski lobby** This group has obviously had considerable influence in the past. The number of people involved is relatively small and there is considerable united opposition involving residents, local conservation groups and progress associations, local councils and canoe groups. It is impossible to satisfactorily police the Water Traffic Regulations and a number of dangerous incidents have been reported in detail to the MSB. Yet there has been great reluctance on the part of the MSB and the Minister to impose measures, such as a speed limit, over the whole river upstream of Figtree, which would preclude skiing. The argument used is that this area is the only remaining waterski area between the harbour and the Hawkesbury River. Safety is supposedly adequately protected by river patrols and the 'automatic' preclusion under the regulations of skiing in areas less than 60m wide.

Due to the controversy and representations to the Minister, the MSB and the Ombudsman over several years, led by Lane Cove Council, the matter was referred to the Boating Safety Council, an arm of the MSB, in 1983 for examination. Despite its recommendation of a speed limit and the death, in February, 1984 of a skier in an ostensibly wide section of the river, speed limits have been announced only for the river above and below the main waterski belt.

4. **Elcom plans** in the valley. The process of upgrading of the transmission line is likely to disturb bushland areas which have barely recovered from the disturbances of the past. Whilst this disturbance is at least temporary and adequate environmental practices can ensure best recovery, the planned substation will be a permanent feature greatly detracting from the visual amenity and naturalness of the foreshores and very difficult to screen. Electricity installations already represent some of the worst intrusions in the valley in that little can be done to disguise and blend them into the environment (Photo 14 shows very obtrusive towers while Photo 2 shows the lines and towers down the valley).

However, the principle on which the upgrading is founded, that is, that, to achieve additional power supplies, upgrading is preferable to proliferation, is environmentally sound. If, after adequate evaluation of the options being considered, this upgrading can be demonstrated to be necessary in terms of power demand and most suitable on environmental, not just economic, grounds, considerable attention should be given to the location and design of the substation with regard to its impact on the visual amenity of the environment.

5. **The Lane Cove West industrial area link routes.** At present access to the Lane Cove industrial area is via residential streets, causing problems of noise and heavy traffic for residents. The proposed solution is the construction of two link roads - the northern one was to dip down the escarpment from the end of Sirius Road and cross the mouth of Stringybark Creek to link with the Epping Highway. The southern would link to Centennial Avenue via Beatrice Street and the bushland along the western edge of Blackman Park. Thus the tiny remnants of bushland remaining in this highly urbanised area are, once again, being seen as the answer to servicing problems. Further, the northern link road proposal would have involved approximately 6m of fill across the mouth of Stringybark Creek and a total width of 40-50m including batters. This would be disastrous for the natural values of this area. It would visually and recreationally cut off the Stringybark Creek bushland from the river, destroy the peacefulness of the area with heavy traffic along the river at yet another point, obliterate a considerable area of native vegetation and create sediment and run-off problems to the river. It will be difficult to achieve a road of satisfactory grade and curve alignment down the escarpment. Here the road will also have severe impact visually and on the vegetation downslope.

By 1985, the link road proposals had been modified to concentrate on the northern link road although in a different location further up the Stringybark Valley. In the new location it would not impact the river foreshores but , if constructed with fill would destroy important wildlife habitat and cut the corridor of the Stringybark Creek bushland for both wildlife and people using walking tracks to the river.

These road proposals were first put forward in 1978 but have not gone ahead mainly for reasons of cost (northern road - $1.7m, southern road - $0.8m, December, 1982 estimates). As there is satisfactory road access to the industrial area, the DMR is not willing to fund an alternative. Resident objections are a Council problem and they must build such alternatives. If money were available it is likely that a road would be built to satisfy vocal residents and the west ward aldermen elected on the platform of the traffic problem, despite opposition from other west ward residents and the LCB&CS and its supporters.

11.5 Administrative Structure

The creation of all new greenways or linear parks face the same problems of fragmented ownership and control and of finding a suitable structure to administer a development or management plan to achieve the goal of holistic or integrated planning and development. Generally the options fall into three categories:

a) Utilising the most suitable existing management authority, for example, for Melbourne's Yarra Valley it would be the MMBW, to which local reserves are transferred, directly or by purchase. The most commonly perceived problem with this alternative is the loss of local accountability.
b) Continuation of the multiple government responsibility to implement sections of the master development plan. Success depends on funding and the level of cooperation achieved.
c) Creation of a new responsible authority with, for example, representatives from local councils and other government bodies having direct interests in the park.

In considering these alternatives, the suitability of the two existing structures in the valley must be examined. One is the fragmented administration of multiple state government bodies and local councils as exists at present below Fullers Bridge. This is obviously unsatisfactory as their approach is united only by vague open space zonings. Whether a regional plan alone would provide sufficient integration and reason for consultation and cooperation is quite unknown.

Secondly above Fullers Bridge, within the SRA, the Trust has complete control over decision-making and development including control of the waterway from the base of the weir upstream. As an existing authority it is not strictly analogous with the more common situation of an existing government department or authority which tends to be perceived as bureaucratic and insulated from the people and the local community. As a separate body set up to administer the Lane Cove National Park, the Trust has elected representatives from the local councils adjacent to the SRA, as well as appointed members.

The Trust form of administration has had great problems in the past, particularly in the sphere of adequate environmental resource management, with the lack of appropriate technical or professional qualifications on the Trust or among park staff. With the transfer of SRA's to National Parks and Wildlife Service administration and the appointment of professionally qualified managerial staff, management of the environment has become more professional but there are still problems with a structure which gives the ultimate responsibility for environmental decision-making to a group of essentially unqualified people.

Whilst this situation is analogous to local government, there are important differences. Aldermen have much larger and more varied technical staff to support them and advise and report on individual issues. Aldermen are also responsible directly to the people who can also closely scrutinise their decision-making (in council meetings) and their actions. An alderman not felt to be acting appropriately can be voted out by the people within a relatively short period.

Where appointment of Trustees was once by recommendation from the 'old boy' network producing a rigid, self-perpetuating group of very well meaning but often disastrously unqualified Trustees, appointments are now advertised, closely scrutinised by the Service and appointed by the Minister. This structure has the potential to create a distinctly better qualified Trust over a period of time, or to create a denizen of political appointments. For example, a recent appointment illustrates both possibilities - that of a well qualified and dedicated conservationist who also happened to be an unsuccessful Labour candidate in a nearby blue-ribbon Liberal seat in a recent election.

The role of the NPWS is to provide advice and guidelines for planning and development, to produce management plans and to "provide opportunities ...for trustees to broaden their knowledge and experience in the management of parks....aimed at increasing the capacity of Trusts to make good management decisions (Johnstone, 1981). Despite this available backup, funding via NPWS and a plan of management, ad hoc decision-making and decisions outside the framework of the publicly debated plan still occur.

A mooted alternative to the Trust structure is to put the power of decision-making in the hands of the NPWS and change the Trusts to Advisory Committees. This may only mean swapping the dangers of an unqualified Trust for the dangers of a monolithic bureaucracy isolated from the local situation. On the other hand, it may mean a greater utilisation of NPWS expertise. In practice, whichever structure is chosen, the essential element is an adequate plan of management, a public document devised with public input, publicly debated and whose implementation can be publicly scrutinised.

Possible Structures for the Middle Valley

There are two obvious alternatives in administration structures to implement a coherent plan for the study stretch of river. The first is to consolidate all the foreshores and most of the adjacent bushland under the management of the SRA. This has the advantage of best enabling the integration of the functions of this area with its upstream continuation. It also combines the efficiency of using an existing structure with the advantages of incorporating local representation. It has the disadvantages of the Trust structure as outlined above. Also, SRA management can only consider areas directly under its control and would have no jurisdiction over adjacent bushland nor be able to pursue policies for the catchment.

The second is to develop a regional plan for the catchment to be adhered to by all councils, authorities and bodies with jurisdiction or interest in the catchment and, particularly, along the foreshore. This would put a legal obligation on the multiplicity of authorities but would not necessarily result in adequate and integrated development and management of all the foreshore areas unless the plan was quite prescriptive in detail for those areas. Funding is more difficult in this situation as councils may have to rely on a variety of ad hoc sources such as the Community Youth Employment Schemes.

Consolidation under the SRA can be achieved through either acquisition (ie. direct purchase of land to add to the park) transfer from government bodies or councils, or dedication of any remaining areas of unreserved Crown land, or by lease of lands by the SRA Trust[3]. Both avenues are currently being explored by, and for, the SRA in an attempt to rationalise land use and ownership along parts of the river. The foreshores and available bushland between Fullers and Epping Road bridges on the northwest (Ryde) bank are being added to the park by purchase and interdepartmental transfers. Much of this land has been intended for the Park since the County of Cumberland Plan.

On the Ryde bank from Epping Road to Buffalo Creek, is a patchwork of government ownerships but, with its freeway reservation, the DMR will not permit its transfer to the SRA. However, in order to gain control and institute some development for recreation, the Trust is considering requesting leases for all the unoccupied areas, apart from a small area of unreserved Crown land on Pages Creek, unaffected by freeway reservation and which can be directly transferred to the park, and Magdala Road tip site.

In Hunters Hill and Lane Cove municipalities the foreshores and bushland, apart from industrial land, a few private residential blocks, some small blocks owned by the MWS&DB for servicing and Electricity Commission blocks, the land is all Council owned reserve. In Willoughby, it is part industrial, part council owned reserve, part Crown reserves (ex 100' reservation) and part Lane Cove River Park land (although not included in the SRA). These three councils may be most reluctant to relinquish ownership of these lands to another authority. During the attempts to enlarge the Park in the 1960's, Willoughby then agreed to transfer some of its lands but Lane Cove has expressed definite opposition and Hunters Hill has often seen itself as too remote to be relevant to the Park.

The best answer for the middle valley is probably a regional plan to cover the catchment with the foreshores and adjacent bushland managed as part of an enlarged SRA under an adequate plan of management, given improved SRA management with more direct involvement of the NPWS either as the management with the Trust as an Advisory Committee or through the choice of Trustees and the availability of staff and expertise. Local accountability to the people is also essential and can be achieved through public input to planning and by opening Trust meetings to the public in the manner of local council meetings.

To achieve such consolidation councils need not lose ownership of their reserves but can lease them, excluding active recreation areas, to the Trust. However, given the political realities of the valley, the most viable alternative may be leasing of some areas, such as those currently being considered and those reserves in Willoughby Municipality as they are interspersed with Crown and Park reserves. Lane Cove and Hunters Hill Councils could implement an agreed plan of management with agreements with the SRA for certain aspects of servicing and supervision best carried out by water in conjunction with these functions on its own lands.

There is no doubt that, unless there is a high degree of cooperation between separate authorities, integrated development will be difficult to achieve without a single authority with the expertise, the power and the funds to carry such a plan through. The creation of a new authority is obviously inefficient in this situation but, should there be agreement to allocate management in the middle valley to the Trust there should be:

a) return of Hunters Hill and Lane Cove Council representatives to the Trust,

b) incorporation of representatives from government authorities concerned, at least for the period of the development of a plan,

c) further upgrading of the technical and professional staff structure and their support staff,

d) introducing public accountability of the Trust, for example, by opening of Trust meetings to the public.

Notes and References

1. Susan Skye, Department of Environment and Planning, pers. comm.

2. Jeff Robinson (skipper), Pier One Cruises, pers. comm.

3. Note that the Lane Cove River State Recreation Area (SRA) Trust has control over only those lands formally constituted within the SRA (Map 17 for such land in this part of the river). Other portions of land downstream of Fullers Bridge which were originally purchased for inclusion in the lane Cove River Park but were not included in the SRA, when proclaimed, are managed under a separate Trust - the Lane Cove River Park Trust. This Trust was virtually defunct for a number of years but, with a recent resurgence of interest in the middle river by management of the SRA, has been rievived to initiate some development/management of its land, for example, the regeneration work at Sugarloaf Point. The Trustees for the Lane Cove River Park Trust are largely the same as those on the SRA Trust.

CONCLUSION

CONCLUSIONS

Methodologically, this study demonstrates the importance of surveys and plans to history and the wealth of environmental and historical information available in the survey sections of government departments and authorities and, particularly, in Lands Department plans. Histories are frequently weak in spatial considerations with an emphasis on 'who?', 'what?' and 'why?' with little, or inaccurate attention to exactly 'where?'. A marrying of historical and geographical skills is obviously of importance in environmental history, but many gross inaccuracies in just the local histories utilised in this study have been perpetuated through inadequate use of, or attention to detail in, maps.

Academically, the study points to a largely undeveloped area of environmental studies - environmental history. In much current environmental research, the past is ignored, or presented merely as a token preliminary to a study of the present. As these studies form the basis for environmental planning, planners thus lack sufficient knowledge to make the best decisions. Thus it is necessary that the environmental history of Australia, particularly since white settlement, be developed as a field of study to provide long term perpectives for current planning.

Specific areas of future research opened by this study are:

* The exact nature of Sydney Harbour's shoreline vegetation at the time of white settlement and processes of change since settlement.

* Mangrove growth on the NSW coastline. Some questions to be answered: Are the highly significant increases since white settlement, indicated in this study, general? If so, have they occurred by colonisation of new mudflats or invasion of marshes? What are the major factors influencing this growth and the timing of this growth? Are there geographical limits to such major changes since settlement, that is, is there a point towards the tropics where mangrove extension becomes less significant in the context of natural mangrove growth, or a point to the south where extension is limited due to climate?

* Structure, species and density of the bushland at the time of settlement and changes since, particularly in respect to fire and disturbance.

* The relationship between raised nutrient/moisture levels and fuel build-up in urban bushland.

* Fauna at the time of settlement and changes in fauna species and distribution with the impact and gradual expansion of settlement.

* The impact of local conservation groups on local politics and thus on the policies and physical character of local government areas.

In terms of the aims expressed in the Introduction, the study has conclusively demonstrated that perspectives derived from a knowledge of past events and processes which have shaped an area, are of fundamental importance in present environmental decision-making from planning future uses of an area to decisions on management of bushland and other open space. Common assumptions about the past, implicit in much planning, are often wildly inaccurate and may result in poor management decisions.

This study has drawn out historical perspectives relating to the nature of the physical environment itself and to issues of human use and planning. These perspectives have then been used in the formulation of proposals for the future and in discussion of administrative possibilities. The study has also demonstrated, as have the Botany Bay studies, the complexity of issues involved in planning man's use and management of natural/semi-natural areas in an urban environment. The importance of integrated, yet in depth studies preceding such planning, is thus obvious.

With respect to the physical environment, some of the most significant findings relate to the mangroves which now line the waterway in an almost unbroken fringe. At the time of white settlement of Sydney these mangroves existed only in small patches near Figtree. With the impact of settlement in the catchment, including accretion of sediment along the shoreline, they have colonised the shoreline upstream to the limit of tidal influence thus narrowing the river, impeding access and restricting the fine views which once existed up and down the river. They are still colonising the few gaps which remain, even in difficult physical situations such as rock ledges.

In the process of this expansion, they have taken over a number of areas which were formerly marsh or grass swamp and have hidden other former shoreline vegetation, such as the dry sclerophyll woodland slopes, casuarinas and paperbarks, behind a high wall of mangroves from 2m to 10m in depth. Yet, Chapter 8 demonstrates that the narrow fringe of mangroves upstream from Figtree Bridge does not serve the range of biological functions demonstrated for mangroves elsewhere.

Thus, in the light of the picture of the 'pre-white' shoreline vegetation assembled by this study, it is recommended that some of the narrowest of the mangrove fringe be removed and the shoreline replanted with casuarinas, paperbarks and other former shoreline species. This will allow better access and views between land and water and will restore some of the 'pre-white' shoreline ecological variety. It will also serve recreational, environmental and educational purposes.

This study also takes the examination of the 'pre-white' extent of mangroves out into Sydney Harbour and concludes that the common assumption which sees their present extent there as only a remnant of some former glory is erroneous. Shoreline grass and reed swamps may well have been far more common than is presently supposed. Another assumption examined is that of decline in fish in the Harbour compared with its 'natural' state. On the evidence of current yields and historical accounts of fish found in Sydney Harbour by the First Fleet, this is also found to be wrong. Fish populations appear to have increased dramatically although this study did not examine changes in species variety.

Changes in the vegetation of the bushland must also be recognised and management guidelines determined in the light of past changes as well as present and future needs. Such changes involve weed invasion, changes in community structure and loss of species abundance and variety due to exploitation of the bushland, changes in nutrient and moisture status and closure of the canopy.

Closure of the canopy and changes in species composition are partly a result of lack of fire. The role of fire and Aboriginal burning in creating the structure of the bushland prior to white settlement and the subsequent changes in vegetation wrought by changed fire regimes needs to be considered in a far more dispassionate light than has hitherto been the case amongst those in conflict over management of bushland of the Lane Cove Valley. The Aborigines burnt frequently, thus fire was important in contributing to the structure of vegetation found here in the 18th century. Although there is little direct historical evidence, the nature of the vegetation found by the early settlers and the current biological evidence point to a varied fire frequency according to the environment - more frequent (possibly every 1-2 years) burning of the grasses beneath the tall forests of the clay ridges and less frequent burning of the sandstone vegetation (7-20 years, varying from place to place).

Other possible conclusions from the evidence presented in this study are that even the sandstone vegetation was far more open than it is today, influenced by two factors: the low nutrient status of the soils at that time compared with the high nutrient levels of today, and the greater fire frequency. It follows also that the denser, nutrient promoted vegetation of today builds up fuel and fire hazard more rapidly.

Thus a possible management plan for both fire hazard prevention and bushland conservation values in the remaining fragments (sandstone vegetation) may include protection of the bushland from all nutrient input from upslope combined with burning at a 10-15 year interval and hand clearing the edges if required in between. Severe reduction of nutrient input should reduce growth and thus fuel build-up (nutrients already added to the cycle may require harvesting ie. when handclearing is done the debris is removed). The 10-15 year burn will then serve the purposes of both hazard reduction and maintainence of the structure of the bushland.

The river, its foreshores and adjacent bushland have undergone dramatic physical changes, particularly over the second century of settlement. These changes involve changes in vegetation, both shoreline and in the bushland, sedimentation ie. shallowing and narrowing of the river (the depth has since been restored but only some of the width) and filling of large areas. Yet the valley retains a dominantly natural aspect which can lead the conservationists of today into an unbalanced desire for preservation of today's environment as a remnant of the past. To recapture some of the past yet further changes must be made.

In planning for the use of the valley, historical perspectives are again important. It is clear that throughout the second century, from the first subdivision of the Field of Mars in the 1880's, the thrust of all planning efforts has been towards the use of the valley for open space and recreation. Yet, for various political and administrative reasons, the co-ordination and unification achieved above Fullers Bridge has never been realised lower down. The study has sought to direct planning attention back to the river and its valley as a physical entity requiring planning and management as a whole. With the development of settlement and transport lines along the ridges, the river and its

immediate valley was consigned to the outer edges of a number of municipalities: a convenient, although not environmentally appropriate, boundary. This abandonment has been responsible for much of its abuse but also for the relative lack of development along much of its shores. However, it is now time to bring the focus of attention back to the river and its valley and their potential.

As a peaceful enclosed valley environment with a good waterway, this area is a very important recreational resource, environmentally abused and greatly underused for lack of appropriate development in a context of heavy pressure on surrounding developed resources. It is thus vital that a regional plan be prepared for the Lane Cove Valley to co-ordinate development. The ultimate goal, for this area, must be the maximum efficient resource use consistent with maintenancee of the area's natural and conservation values. From the environmental history of the study area it is obvious that most areas have experienced considerable environmental change and thus a preservationist approach to such an area needed for recreational uses is not appropriate. Allocation of funds for recreational development and management will also allow regeneration of degraded areas.

The recreational development proposed in this study seeks to capitalise on the valley's attributes and values to provide varied opportunities for the maximum number of people while maintaining and enhancing those values. The proposals include a series of riverside picnic areas, some with car access and a greater range of facilities and some with access by foot or boat only and a series of walking tracks including loop tracks. They also include a cycleway to link many areas of the valley to the State Recreation Area in an area where cyclists are very poorly served due to the volume of traffic on the roads and the nature of the topography. A further important aspect of the proposals is an emphasis on multipurpose use of developed areas, particularly the active recreation zones, to encourage more efficient use of these resources.

Management for consolidated and developed recreational areas along the river should probably be undertaken by those who administer the State Recreation Area above Fullers Bridge, whether they own the land or lease it from local councils and state government bodies. However, the political realities of the middle valley may not allow complete consolidation and some areas may remain under management of, for example, the local councils. This again underlines the necessity for a regional plan. To enable any consolidation, the public, especially the local conservation groups, must be assured of the SRA administration's professional expertise. The Trust and their decisions should also become more open to public scrutiny.

Chapters 8 and 9 examined further aspects of planning for the valley. Chapter 8 demonstrated the historical process of alienation of valuable flat riverside parkland by lease to sectional private interests ie. Chatswood Golf Club. These flats are of high value for passive recreation as evidenced by the saturation level of use of the nearby State Recreation Area. In the vicinity of the golf club, however, the public has been left with the cliffs and steep slopes of Mowbray Park and a tiny, sloping picnic area on Reid Drive which has no view of the river. Mowbray Park has high values for bushwalkers but these are a relatively small proportion of the population compared with those who wish to enjoy an outdoor "gregarious social experience within 100 metres of the family car" (Mercer, 1981). The history of this alienation reveals it to have been acquired by stealth, power and persistence over a long period despite its origin as a decidedly temporary lease, an earlier Lands Board decision against such a lease, long term Lands Department opposition to permanence and considerable public opposition. Thus the golf club's occupation should not now be regarded as permanent. It should be re-evaluated in the light of the history of their acquisition of such occupation and public need for the land.

The study emphasises the importance of the valley's lands as a relatively rare, yet highly desirable, type of recreation resource and thus regards the impact of the planned freeway as disastrous. It would result in the effective loss of half the study area as such a resource through both physical loss of considerable segments of bushland and foreshore and through severe impact on the values of the remaining areas on both banks.

Historically, local conservation groups have played a very important role in preservation of pockets of bushland from unwise development, in developing management guidelines for that bushland, and in influencing local politics and election of aldermen. Many of the groups in the middle Lane Cove Valley were early starters in the local conservation movement, arising in the late 1960's and early 70's out of the environmental awakening of the 1960's and in response to a local threat. These groups now have much experience, organisation and influence and, joined by more recent groups from the upper valley, are united by umbrella groups.

Thus planning for the valley must be consultative and involve these groups in the formative stages. Yet care must be taken that they do not dominate such planning as the attitudes of some can be uncompromisingly preservationist towards the use and management of bushland - attitudes which may be inappropriate to riverside areas of high value to

many people other than those these groups represent.

Environmental history, to now, has been a largely neglected field. In its short life span environmental studies has been too busy collecting facts about the present to worry about the past. However, with the current spate of planning activity, the preparation of Local and Regional Environmental Plans and environmental impact assessment, it is important that greater attention be directed to the past. Planning based on incorrect assumptions, rather than serious investigation, of past events and the past nature of the environment may result in decisions which are not in the best interests of the environment or the people.

APPENDIX I

GOVERNMENT BODIES AND CITIZEN GROUPS ASSOCIATED WITH THE MIDDLE LANE COVE VALLEY

Local Government

The Lane Cove River betwen Figtree and Fullers Bridge is part of the boundary of four local government areas:

Hunters Hill Municipality
Ryde Municipality
Lane Cove Municipality
Willoughby Municipality

Above Fullers Bridge the River is also a boundary for Ryde Municipality, Ku-ring-gai Municipality and Hornsby Shire while Parramatta has a small excision in the western part of the catchment (Map 1).

State Government

A number of government departments and authorities have a direct interest in the study stretch of the river through land ownership and/or installations or direct responsibility for the waterway:

Department of Lands - retains some parcels of land.

Metropolitan Water Sewerage and Drainage Board - NOOS crosses the river via a tunnel under the bed and is joined by submains on east and west banks which are, in turn, fed by sewers down most of the tributary creeks. Overflows are located on the river for the NOOS and the submains. Ownership of small parcels of land for installations and access.

Electricity Commission - high voltage transmission line, substation, site for future substation, transition point and easements.

Department of Environment and Planning - ownership of land, responsibility for planning, assessment of Environmental Impact Statements for designated developments.

Maritime Services Board - ownership and responsibility for the waterway to high tide mark.

State Fisheries - protection of fisheries resource, maintenance of marine habitats and resource management.

State Pollution Control Commission - responsibility for administration of the Clean Waters Act and the Clean Air Act, prevention and control of pollution of the waterway.

Department of Main Roads - reservation of land for a major freeway.

Sydney County Council - easements for electricity lines, submarine cables crossing the river.

National Parks and Wildlife Service - responsibility for Lane Cove State Recreation Area.

Other government bodies which may be involved from time to time are:

Public Works Department - construction of wharves, jetties, landing ramps.

Board of Fire Commissioners - responsibility for prevention of fire hazard and may require hazard reduction burning of bushland.

Health Commission - approval of uses of areas of sanitary fill and garbage disposal, issuing of notices for filling of lowlying land, concern for pollution of recreational waters.

Conservation Groups

Groups with a direct interest in the bushland and conservation issues of the study area are:

Lane Cove Bushland and Conservation Society
Ryde-Hunters Hill Flora and Fauna Preservation Society
Hunters Hill Trust
Mowbray Park Association
Fullers Bridge Association
Union of Lane Cove Valley Conservationists { umbrella
Willoughby Environment Protection Association { groups

In the valley above Fullers Bridge concerned groups are:

South Turrumurra Environment Protection Association (STEP)
Ku-ring-gai Bushland and Environment Society (KUBES)
West Pymble Bushland Society
Beecroft-Cheltenham Civic Trust

Progress Associations

Those concerned with, or adjacent to the study area are:

The Lower Burns Bay Association
West Lane Cove Progress Association
Chatswood West Progress Association

Not falling into any of the above categories but having responsibility for an important and sizable section of the Lane Cove River and its valley, including sections of the study area is:

Lane Cove River State Recreation Area Trust

APPENDIX II

APPROACH, DATA SOURCES AND PHOTO LOCATIONS

Approach

The approach adopted is largely idiographic in the manner of history or regional geography, yet draws deductively from general theories and bodies of knowledge to set the individual issue and area within its relevant context.

However, the object of this approach is to achieve a synthesised understanding of the forces and events which have shaped its past, its present and will shape its future. Such synthesis and consequent intuitive judgement has always distinguished history and some branches of geography but is not necessarily accepted as the province of academic environmental studies. Harris (1971) described it as seeing together the complex factors that make up the character of places, regions and landscapes or concepts, events, societies and periods and "finding a coherent path through the endlessly complex welter of facts to arrive at a full explanation".

By its nature, environmental studies, at some stage, must take this more synthesising view of explanation. The reductionist approach of single scientific fields may provide the data base but the holistic approach which synthesises these data in specific areas should have a place in academic environmental studies rather than being purely the province of commercial consultants, government planning departments or local town planners, all of whom work under constraints of time, finance, implicit bias and/or lack of relevant expertise.

After succumbing to the scientific or quantitative revolution of the 1960's, the field of geography went through much soul-searching over its 'true' nature - positivism vs. phenomenology, systems analysis vs. holistic approaches - as it exploded into a variety of directions in the 1970's, all now recognised as valid in their own right. Likewise, some of the social sciences which wholeheartedly adopted scientific approaches have found the need to return, for some of their work, to holistic approaches involving judgement and synthesis to fully explain human experience and decisions, for example, in sociology and some branches of psychology.

Environmental studies, as a relatively new, interdisciplinary field, has yet to establish its parameters. It is still happiest when tied to one of its foundation disciplines, unsure in testing its wings to fly in its own right.

It is the underlying premise of this study that an important task of environmental studies lies in the synthesis between disciplines to more fully explain the environment and the factors impinging on it. To achieve this, the study draws heavily on the methods of history and geography to produce such a view of past and present patterns and changes as they point to the future.

The Data

This study involved the searching out of an array of data from a variety of sources. These were:

a) Written material This included all known studies on the river and its catchment, historical material from Mitchell Library, the State Archives and the excellent local history sections in Lane Cove, Willoughby and Ku-ring-gai Libraries, the minutes of the Lane Cove National Park Trust and the Committee which preceeded the Trust as well as other documents and files held at the headquarters of the Lane Cove State Recreation Area (SRA), local newspapers and records, minutes and files of local conservation groups. In addition, literature surveys were required for various issues/aspects pertaining to the river and its bushland which required detailed study eg. mangroves, aboriginal use of fire and trends in recreation.

b) Oral Material Personal unstructured interviews or informal discussions were conducted with representatives of local councils (elected and administrative), local conservation groups, relevant government departments and authorities, present and past Trustees of Lane Cove SRA and its manager and other individuals concerned with the valley, such as the operator of dredging on the river and local waterskiers.

c) Maps and Surveys An often neglected source of historical and environmental information are maps, surveys and plans dating back over the period of settlement. The early maps tend to lack accurate detail but by the 1850's the style had improved considerably,

providing much information. The well known sources of maps are Mitchell Library and the State Archives but the major repository of surveys and plans is the Lands Department Plan Room. In addition, many government departments have survey sections with detailed plans of areas which have concerned them and usually with record cards pertaining to areas of land with which they have had dealings. For this study, much data were gathered from survey plans of the Metropolitan Water Sewerage and Drainage Board (MWS&DB) and, especially, the Maritime Services Board (both hydrographic surveys and shoreline surveys). Maps and plans used or examined are listed in Appendix III.

d) Photographs These have proved invaluable for assessing changes in the environment, especially in vegetation. Aerial photograph series are held by the Lands Department and have been taken approximately every 5 years since 1951. Ground photos have been gathered from a variety of sources including the Small Picture File and volumes of newspaper cuttings (Plummer, Vols 49 & 50) in Mitchell Library, the Lane Cove SRA records, the local history collections of the libraries previously mentioned, and the MWS&DB archives. High quality photographs were taken of all Public Works constructions and many of these appear in the Public Works Department Annual Reports of late last century and the early 20th century. When various functions, such as water and sewerage were split from Public Works, the negatives of previous relevant operations were taken with them.

e) Personal Observation The study area was extensively examined and photographed on foot and by boat. Periodic observations of the level and nature of current recreational use were also made.

APPENDIX III

LIST OF MAPS AND PLANS CONSULTED

This list contains the more important of the maps, plans and surveys consulted and utilised. The number in brackets indicates map number where it is reproduced, in whole or in part, in this work.

State Archives

(3)	1831	AO Plan 1090	Survey of the Lane Cove River to its Source
(4)	1831	2/4992	Surveyor Larmer's Field Book of his traverse of the Lane Cove and Parramatta Rivers
(6)	1847	AO Plan 2718	Survey of the Field of Mars Common by Galloway

Department of Lands

	Parish Maps		Willoughby, Sheets 1 & 2
			Hunters Hill, N.E. Sheet & S.E. Sheet
	1832	C87-690	Survey of 25 Acres (Portion 189, Parish of Willoughby
(8)	1881	W23-2005	Plan of Roads in the Parish of Willoughby, No.1 from Lane Cove Road to Lane Cove River
	1882	C386-2030	Parish Map of Hunters Hill
	1882	C36-2063	Plan of Proposed Reserves in the Field of Mars Common
(9)	1883	15-440 Sht.1	Plan of a Survey of the Field of Mars Common

The following seven maps are plans of the 100' reservation between the foot of the Mowbray Road reservation and the Hatfield Road reservation in Willoughby (both unmade sections). In this work they have been composited into one map - Map 14.

1886 1044-2030 fronting J.R. Hatfield's 30 acres and 31 acres.

1886 C912-2030 fronting John Jones 25 acres applied for by H.Whatmore

1895 1080-3000 Portion 975 applied for by Mrs I.R.B. Bradley

1897 1285-3000 (similar area as above)

1898 1350-3000 Portion 976 applied for by Thomas Allright Dibbs

1908 2908-3000 fronting J.R. Hatfield's 30 acres

1913 4302-2000 part of J.R. Hatfield's 30 acres

Also consulted and useful for this work:

14086 Sy Lavender Estate subdivision

C1954-59 2030{ Subdivision and sale details of former Field of Mars

C1896-98 2030{ Common land from Magdala & Pittwater Rds to River Ave

3180Sy 100' reservation on O'Brien's property (south of Stringybark Creek)

C50-2030 shows details of Brockman's tannery on the Field of Mars Common

Maritime Services Board

Hydrographic Surveys of the Lane Cove River:

1908 Riverview to Fullers Road

1909 Riverview to Fullers Road

1928 Figtree Bridge to Fullers Bridge

1954 Fullers Bridge to Buffalo Creek

1956 Buffalo Creek to Figtree

1965 Stringybark Creek to Lincoln Street (Lane Cove)

1968 Lincoln Street to Thorn Street (Hunters Hill)

1980 Figtree to the Sewer Crossing

Other surveys:

1929 H.H.235 fronting part of Boronia Park Reserve

1929 W.L.322B plan of lower part of Stringybark Creek

1976 W.L.1084 plan of part of Linley Point (incl. later amendments)

Also: other field surveys now on microfilm eg. Blackwall Wharf, Sugarloaf and the area of the watermain and the footbridge.

Planning Schemes

Ryde - Sheet 2, Lane Cove, Willoughby and Hunters Hill

Other

Also consulted were various maps and plans held by the Lane Cove State Recreation Area and survey information of the Metropolitan Water Sewerage and Drainage Board.

APPENDIX IV

LIST OF SOME PLANT SPECIES FOUND AT RIVERVIEW, 1881 - 1908

The following list is derived from an article "Some of Riverview's Flora" in **Our Alma Mater**, 1911, the magazine of St. Ignatius College, Riverview. In the first part of the list are species common in the area and mentioned in the main article by Patrick J. Dalton. The more extensive lists of Orchideae and Proteaceae were put together by Percy E. Williams and appended to that article.

Where they vary, the species name used today is given in brackets while * indicates species not mentioned by Beadle et al (1982) in their **Flora of the Sydney Region.**

MYRTACEAE

Melaleuca leucadendron (quinquenervia)
hypericifolia

Leptospermum scoparium
attenuatum

Kunzea corifolia (ambigua)

Callistemon linearis

SAXIFRAGEAE

Cerapetalum gummiferum

LEGUMINOSAE

Acacia longifolia
decurrens

UMBELLIFERAE

Actinotus helianthi
minor

PROTEACEAE

Petrophila pulchella (Petrophile fucifolia)

Isopogon anethifolius
anemonifolius

Conospermum longifolium
tenuifolium
ericifolium

Persoonia ferruginea (laurina)
hirsuta
nutans
*lucida
lanceolata
linearis
pinifolia

Xylomelum pyriforme

Lambertia formosa

Grevillia mucronulata
buxifolia
punicea
sericea
linearis

ORCHIDEAE

Dendrobium speciosum
tetragonum
teretifolium
cucumerinum

Sarcochilus tridentatus

Dipodium punctatum

Cymbidium suave

Galeola cassythoides

Gastrodia sesamoides

*Spiranthes australis

Thelymitra ixioides
longifolia
pauciflora

Diuris alba (punctata)
*elongata
maculata
*aequalis
aurea
sulphurea
pedunculata
bracteata

Orthoceras strictum

Calochilus campestris
Robertsoni
paludosus

Cryptostylis erecta
*longifolia

Prasophyllum australe
patens
striatum

Microtis parviflora
*porrifolia

Corysanthes unguiculata
(Corybas unguiculatus)
fimbriata
(fimbriatus
*bicalcarata

Pterostylis concinna
nutans
curta
grandiflora
rufa
longifolia

Hakea pugioniformis (teretifolia)
dactyloides
gibbosa
acicularis (sericea)
propinqua

Lomatia silaifolia

Telopia speciosissima

Banksia ericifolia
marginata
serrata

Calcana major
minor

Acianthus caudatus
fornicatus

*Crytostylis reniformis

Lyperanthus nigricans
suaveolens

*Eriochilus autumnalis

Caladenia carnea
alba
coerulea

Glossodia major
minor

APPENDIX V
NATIVE MAMMALS KNOWN TO OCCUR IN KU-RING-GAI CHASE, BANTRY BAY AND THE LANE COVE VALLEY, 1978*

(Order as in Kirsch and Calaby 1977, based on Ride 1970)

Scientific Name	Common Name	KG	BB	LC
MARSUPIALIA				
Dasyuridae:				
Antechinus stuartii	Stuart's marsupial mouse	+	+	+
Peramelidae:				
Perameles nasuta	Long-nosed bandicoot	+	+	+
Isoodon obesulus	Short-nosed bandicoot	+		
Phalangeridae:				
Trichosurus vulpecula	Brush-tailed possum	+	+	+
Burramyidea:				
Cercartetus nanus	Pygmy possum	+		
Acrobates pygmaeus	Feather-tail glider	+		
Petauridae:				
Petaurus breviceps	Sugar glider	+		+
Pseudocheirus peregrinus	Ringtailed possum	+	+	+
Macropodidae:				
Wallabia bicolor	Swamp Wallaby	+	+	
Macropus rufogriseus	Red-necked wallaby	+(i)		
Phascolarchidae:				
Phascolarctos cinereus	Koala	+		
RODENTIA				
Muridae:				
Rattus fuscipes	Southern bush rat	+	+	
Rattus lutredus	Eastern swamp-rat	+(ii)		
Hydromys chrysogaster	Eastern water-rat	+		
Pseudomys novaehollandiae	New Holland Mouse	+		
MONOTREMATA				
Tachyglossidae:				
Tachyglossus aculeatus	Spiny ant-eater	+	+	+
Ornithorhynchidae:				
Ornithorhynchus anatinus	Platypus	+(iii)		
	TOTAL CONFIRMED SPECIES	17	7	6

(data from all available sources)

NOTES:

(i) may be escapees;

(ii) first record for Ku-Ring-Gai: Sept., 1977, A.B. Rose, N.P.W.S.

(iii) actually in Muogamurra Nature Reserve, adjacent to Ku-Ring-Gai Chase.

*from STEPHENS, SARAH S. **The Impact of Man on the Mammals and Birds of the Lane Cove River Valley**, Centre for Environmental Studies, Macquarie University, 1978: p.77.

APPENDIX VI

ANALYSIS OF SEDIMENTION IN PART OF THE LANE COVE RIVER

1880's to the 1960's

The following analysis of sedimentation between Figtree and Stringybark Creek is based on:

1. Maritime Services Board Hydrographic Surveys:
   - 1954 Fullers Bridge to Buffalo Creek } prior to recent dredging
   - 1956 Buffalo Creek to Figtree }
   - 1965 Stringybark Creek to Lincoln St (Lane Cove) } after dredging
   - 1968 Lincoln St to Thorn St (Hunters Hill) }
   - 1980 Figtree to Sewer Crossing }

2. Plan of Proposed Reserves, Field of Mars Common. Surveyed October 1881 to May 1882. Lands Department Plan C 36-2063. This plan shows depths for the river although not always for its entire width.

All measurements are in feet and metres reduced to Spring Low Tide.

It is notable that the 1965/68 surveys were taken just after the dredging of the river. These sections were then in general quite deep - mostly over 10' except near the banks, with many areas more than 20' deep. However, the bottom was very irregular and not yet reshaped by the river into its natural pool and riffle sequence.

Summary of Depth Information for Selected Locations

	1881	1954-6	Recent
1. Former Princes St wharf and channel	5 - 8' 1.5-2.5m	1'3"- 4.5' 0.4-1.4m	1 - 3' 0.3-0.9m

Notes Wharf area (end of Princes St) now not reached by water at low tide. There was no dredging in this area.

2. Main channel of Cunninghams Reach - from Figtree to south end of mangroves at NOOS crossing	4 - 22' (mostly 6-8') 1.2-6.8m (" 1.8-2.5m)	6" - 18' 0.15-5.5m	3 - 21' (1980) 0.9-6.5m

Notes In 1956 the shallow area extending from the mudflats along the west bank (present in 1881) had widened considerably taking up most of the river with long narrow and deep holes against the east bank. Deep section at south end of Figtree Bridge (site of former wharves) is not as deep now (max. 15') as formerly (max. 22').

3. Thorn St to the mouth of Buffalo Creek	4 - 9' 1.2-2.8m	6" - 8.75' 0.15-2.7m	2'6"-48'6" (1968) 0.8-15m

Notes The natural deep channel is on the west bank in this stretch. By 1954 it was very narrow with wide mudflats stretching out up to threequarters the width of the river from the east bank. Off Buffalo Creek depths were no greater than 3'9" (1.1m).

4. Sugarloaf - narrow section

6 - 28'	2 - 33'	1'6"- 8'6" (1968)
1.8-8.6m	0.6-10.2m	0.5-2.6m

Notes Naturally a long narrow and deep hole due to constriction of the width of the river. In 1968, after dredging it was shallower than previously as well as shallower than the bed upstream and downstream - probably due to filling with dredge fines from the plant base on Sugarloaf. Subsequent river action has probably re-established this hole.

5. Stoney Creek to Kittys Creek

3 - 9'	6" - 3.75'	2 - 35' (1965)
0.9-2.8m	0.15-1.1m	0.6-10.8m
	(with one hole 5-8' (1.5-2.5m) opposite mouth of Stoney Ck)	

Notes In 1954, apart from the hole opposite Stoney Creek, this stretch was uniformly very shallow with most of it 6"-2' 0.15-0.6m) deep and extensive mudflats along west side.

6. Kittys Creek to Stringybark Creek

2 - 28' (mostly 4-8')	6" - 19' (mostly 1-4')	2 - 31' (1965)
0.6-8.6m (" 1.2-2.5m)	0.15-5.8m (" 0.3-1.2m)	0.6-9.5m

Notes In 1965, after dredging, the shallowest sections (under 10') were off the mouths of Kittys and Stringybark Creeks. Here silt deposition, as the creeks entered the river would have been resulting in a greater volume of reject material from the dredging. Like Sugarloaf, there is naturally a long deep hole upstream of Kittys Creek where the river is narrower.

APPENDIX VII
SUMMARY OF LANE COVE NATIONAL PARK CORRESPONDENCE WITH ADJACENT COUNCILS OVER AQUISITION OF LAND FOR ADDITION TO THE PARK IN THE MID 1960'S

31/10/66.
Trust advised S.P.A. regarding Hornsby's advice that it did not now propose to agree to the addition of any land to the Trust from Hornsby Shire.
Trust's original aspiration was to obtain land along river banks for passive recreation. Trust asked for this to be given consideration in final allocation of this land by the S.P.A.
22/11/66.
S.P.A. replied, considering any further action should be deferred pending passing of National Parks legislation.
13/12/66. Trust to S.P.A. - unable to understand why proposed National Parks legislation should have any impact on the matter.
28/2/67.
S.P.A. replied that it was not then known that legislation would not effect this Park, and Quote - Having regard to the views expressed by Councils involved, the Authority is of the opinion that the most effective way of resolving the general question of future provisions for extensions to the Park is in the local planning schemes prepared by these Councils. It is considered that both proposals should be dealt with in conjunction with the local planning schemes, when all relevant aspects can be determined.
24/5/67.
From Minister for Lands referring to above and refusing incorporation of land at Porter's Creek.
1/8/67.
Hornsby Shire - no additions to be made to Park, as previously advised.
26/6/67. Ku-Ring-Gai Council- referred to Council's letter of 16/9/65 and plan which indicated proposed boundaries. Some minor variations to this boundary may ultimately be required. Council's local planning scheme with S.P.A. When exhibition takes place, Trust will be supplied with plan.
13/6/67.
Lane Cove Council - Local Planning Scheme under consideration but Council prefers land to remain under the control of Council, as previously advised.
18/1/67.
Ryde Council advised unable to give a decision regarding boundaries until remainder of land north of Epping Road has been re-zoned. Council will require a triangular area of land adjoining Porter's Creek for garbage disposal. Council indicated that because of difficulty of obtaining garbage areas, it is not prepared to cede any more land to the Trust other than that upon which it has already agreed. Will advise when Council has reached a decision regarding the remainder of the proposed boundaries.
28/11/67.
Not changed since Council's letter of 18/1/67. When decision made on re-zoning land north of Epping Road, Trust will be further advised.
29/6/67.
Willoughby Council advised:-
1. Council has no proposals which would affect the Park.
2. Council would co-operate in furnishing any future advice.
3. Council is unaware of any procedure whereby any action can be taken to assist within the provisions of this Council's Planning Scheme.

11/12/67. Trust advised Willoughby Council that there has been no change in the attitude of the Trust regarding the acquisition of the land referred to in Council's letter of 18/12/1963, and the aubject of a plan adopted by both parties and sent on to C.C.C., now S.P.A. (Council also advised that "The Trust is concerned that Council may be under the impression that circumstances may have changed due to the introduction of the "National Parks and Wildlife Bill",".)

Source: Papers of Cedric Farrell, former President, Lane Cove River Park Trust.

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