



# **LAKE CATHIE VILLAGE**

**MASTER PLAN REVISION 2010**

## **SURVEY RESPONSE**

**Prepared by Lake Cathie Progress Association Inc.**

**Basis on survey input from the residents of Lake Cathie.**

# CONTENTS

	PAGE
<b>FOREWORD</b> .....	3
<b>A. INTRODUCTION</b> .....	4
1. The Purpose and Background of the Plan .....	5
2. The Plan Area.....	7
3. Process of Preparation.....	8
<b>B. BASIC INFORMATION ABOUT LAKE CATHIE</b> .....	8
1. The History of Lake Cathie .....	8
2. Demographics .....	12
3. Urban Development to date.....	14
<b>C. DEVELOPING A PHILOSOPHY OF MANAGEMENT</b> .....	15
<b>D. OBJECTIVES OF MANAGEMENT</b> .....	15
1. Access	
1.1 Getting to the Village.....	16
1.2 Ocean Drive Upgrade.....	17
1.3 Houston Mitchell Drive.....	17
1.4 Speed Limits.....	17
1.5 Internal Roads.....	18
1.6 Other Access Needs .....	19
2. The Natural Environment:.....	22
2.1 The Beach and Fore dune .....	22
2.2 The Estuary & Waterways.....	35
2.3 The Terrestrial Landscape (Vegetation and Fauna).....	40
3. Urban Development .....	42
3.1 Planning & Development.....	42
4. Cultural and Community Services .....	45
4.1 Health .....	45
4.2 School Education .....	45
4.3 Fire Management.....	46
4.4 The Community Hall .....	46
4.5 The Library and Adult Education .....	47
4.6 Miscellaneous (Law Enforcement, Waste Disposal) .....	48
5. Sport and Leisure .....	49
5.1 Iron Man Events... ..	50
5.2 Playgrounds .....	51
6. Tourism .....	52

7. Precinct Plans.....	53
7.1 Perch Hole Track .....	54
7.2 Chepana Coastal Reserve.....	54
7.3 Cowarra Creek.....	55
7.4 Jabiru Reserve .....	56
7.5 Foreshore Reserve .....	56
7.6 Kenwood Tallong Drive .....	57
7.7 Tallong Drive Bushland Reserve .....	57
7.8 Aqua Reserve.....	58
7.9 Bundella Avenue.....	58
7.10 Jonathan Dickson Reserve.....	59
7.11 Middle Rock .....	59
7.12 Endeavour Park .....	61
<b>E. PLAN IMPLEMENTATION.....</b>	<b>62</b>
1. Management Recommendations and Priorities .....	62
2. Review of the Master Plan .....	62
<b>F. GLOSSARY.....</b>	<b>63</b>
<b>G. BIBLIOGRAPHY.....</b>	<b>64</b>
<b>H. ACKNOWLEDGEMENTS.....</b>	<b>64</b>

## **FOREWORD**

It is with pleasure that I introduce the 2010 Lake Cathie Master Plan - a blueprint outlining our community's needs and aspirations.

The plan, which is an initiative of the Lake Cathie Progress Association, provides meaningful information to all levels of government. It also gives future Progress Association committees a valuable resource to work from.

Through the formulation of the Master Plan, our community has been asked to help steer its own future. Lake Cathie residents and the Progress Association have responded to that challenge by compiling a comprehensive and informative document.

In the past decade we have seen many positive changes in our village, such as new medical facilities, increased retail options and foreshore improvements. We expect to see many more in the next 10 years as the residential gap between Lake Cathie and Bonny Hills is filled.

Continued local involvement and consultation will be the key to ensuring this vibrant community prospers into the future.

I congratulate all of those who have contributed to this latest Lake Cathie Master Plan.

Lynn Lelean  
December 2010

## A. INTRODUCTION

### Summary of the Lake Cathie Village Master Plan 2010

This document is a revision of the 2000 Lake Cathie Village Master Plan (available on our website) [www.lakecathiepa.com](http://www.lakecathiepa.com)

The **Introduction** to this revised Plan outlines its purpose, scope, and process of preparation. In addition to outlining the residents' vision and wishes for Lake Cathie and its environs, the Plan will enable the community to continue to be pro-active rather than reactive in planning and decision making, and continue in the role of a partner rather than as a supplicant to Port Macquarie-Hastings Council on management matters.

**1. Access:** The ongoing need for improvement to Ocean Drive is stressed. Access problems within the village are also examined, with recommendations made on many issues. These include the update of the Access and Traffic Plan designed to rectify present problems and cater for future traffic growth, particularly with regard to dangerous situations forecast at many intersections, at both shopping centres and along the foreshores. The provision of bikeways, footpaths and tourist/residents' walkways is requested.

**2. The Natural Environment** is considered under the headings of *Beach and Foredune, the Dune System, the Estuary, and the Waterway*. Each receives individual discussion with recommendations covering use by dogs and 4WDs, rubbish dumping, Bitou Bush removal, illegal private beach access, and erosion threats. Much attention is given to the erosion problem in this Plan in an attempt to fully address the problem. This Plan also strongly supports the preparation of an EIS into the reversion of Lake Innes to fresh water provided it is extended to examine other relevant issues such as the bridges, dredging, pollution threats, and social management conflicts.

**3. Urban Development:** Council's present policies and strategies are supported provided they continue to protect the residents' vision of Lake Cathie with its village atmosphere and its reputation as a safe, low-key family tourist destination.

**4. The Cultural and Community Services** section of the Plan covers health, school education, the community hall, fire management, library and adult education facilities, law enforcement and waste disposal. Recommendations are made to support or expand services in these areas.

**5. Sport and Leisure:** Deficiencies in these areas still exist and are noted and criticised. In particular the need for urgently required sports facilities for the young, passive opportunities for older residents, and better located and more diverse active sporting facilities generally are sought in the Plan recommendations. The Iron Man events are also covered in this section.

**6. Tourism:** The need for research to ensure that development of the valuable tourism opportunities in Lake Cathie for the benefit of both residents and visitors is discussed. Likely trends and features within the village which affect tourism and the potential of the Googik Track proposal (a track from Port Macquarie to Lake Cathie and eventually Bonny Hills and North Haven/Laurieton) are covered in the recommendations.

**7. Precinct Plans** for several individual sites of value to both residents and visitors are outlined in varying detail, and priorities for development set out. Planning of these ‘precincts’ pays attention to their natural features, the likely impact of development and use, visitor demand, and in several cases the need to rectify past planning mistakes or omissions. The progressive improvement of Middle Rock precinct, and the planned repair and use of the Coastal Reserve from the estuary to Middle Rock are given high priority, both to reduce visitor pressures on the existing estuary reserves and to provide opportunities for the neglected residents in the southern part of the village.

The final section, **Plan Implementation**, summarises in proposed priority order all of the recommendations set out in the body of the Plan.

It is proposed that progress under the Plan will be monitored annually by LCPA, and that it be continually reviewed each 5 years to ensure its relevance to changed circumstances or community attitudes.

#### **A1. The Purpose and Background of the Plan**

As in most small communities, the development of Lake Cathie and the provision of management services and facilities in the village have been at the discretion of local government and other authorities. The absence of a planning instrument to which the community as a whole has contributed can sometimes see decisions made which conflict with residents' wishes and provoke disputes between them and those responsible. The 2000 Village Master Plan was well received by the then Hastings Council resulting in many of the community's concerns being addressed as a result of that document. Hopefully the present Council administration embraces this revision with the same attitude giving full consideration to the community's wishes when considering planning issues in the future. Not all of the issues addressed in this revision are Council's concerns and a number of other authorities are involved - which include the National Parks and Wildlife Service (NPWS), State Waterways, State Fisheries, Dept of Land and Water Conservation and Dept of Public Works and Services - many issues will be required to be dealt with, individually or collectively.

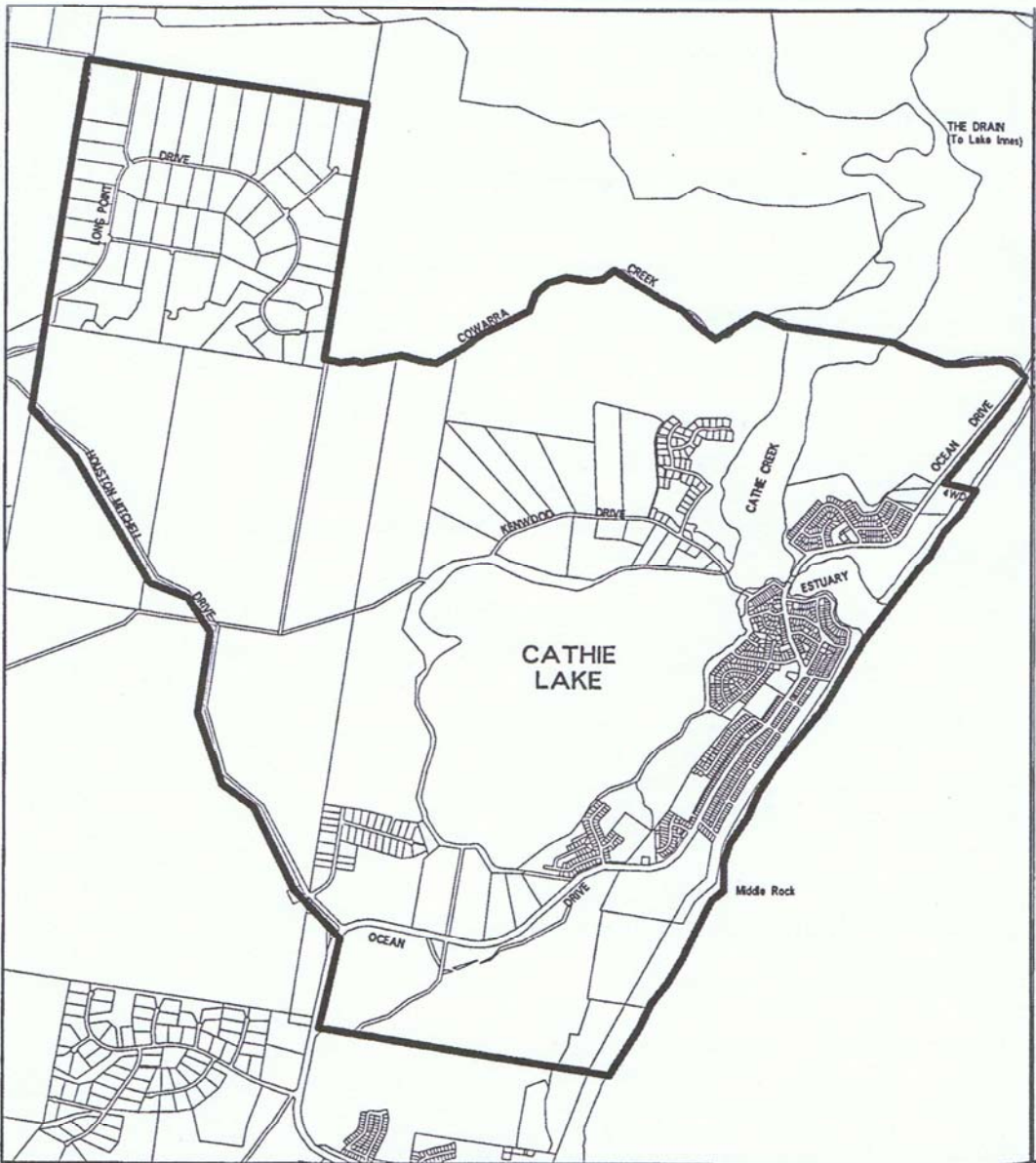
At the General Meeting of the Lake Cathie Progress Association Inc. (LCPA) on 11 February 1997, it was unanimously resolved that the Association should initiate and coordinate the preparation of a Master Plan for Lake Cathie. LCPA's objective was, with community support and input, to compile a Plan which would provide relevant authorities with a clear understanding of how the residents of Lake Cathie would like their village and the areas surrounding it to be managed, protected and developed; i.e. to make the community proactive in long-term planning and decision making rather than reactive to proposals made by others, and to make specific recommendations on activities which should be undertaken within common sense constraints during the period covered by the Plan. This Master Plan, known as The Lake Cathie Village Master Plan 2000, was completed and formally adopted by the Hastings Council in 2000. This revision is based on the data from the original plan and supported with firstly, information gathered at an open day held at the Community Hall, followed by a comprehensive Village Survey completed in 2010.

It must be stressed, however, that like the original Plan, this Plan is also not intended to present the residents' views as the only ones which should be considered or as always the best or most logical even when they depart from or imply criticism of previous decisions or actions. It is hoped that it will be seen as a contribution to the planning process, a genuine attempt to help build a partnership between the community and Council which has not always been evident in the past. To this end, each set of strategies recommended in the Revised Plan will be preceded by a discussion or recommendations which will analyse past decisions and, as far as is possible on the information available to LCPA , review them in the context of current community attitudes.

It is hoped (and anticipated) that preparation and regular review of this Plan also helps to strengthen Lake Cathie as a community, something that has often been threatened in other communities by urban spread and connection to adjoining suburbs or villages. Given the protection provided by the adjoining Nature Reserve and State Forests this threat is not so great here, except for the inevitable linking of Lake Cathie and Bonny Hills, a village with such common characteristics and attitudes that its formal adoption of similar planning philosophies and strategies to those in this Plan should be encouraged. Perhaps to encourage this, thought should be given to the selection of a common logo for the area for use by Council on road signs etc and by village organisations where appropriate.

This Revised Plan will hopefully be used to provide yearly input to the Port Macquarie-Hastings Council's Annual Management Plan, and will be reviewed at the end of each Lake Cathie Master Plan period (i.e. at 5 yearly intervals) to maintain its relevance.

A2 PLAN AREA



LAKE CATHIE VILLAGE  
MASTER PLAN

MASTER PLAN AREA

Scale 1:35000



Map 2



Refer Lake Cathie Village Master Plan 2000 for the map details, but generally the area referred to in this Plan is the Village area that is bounded –

- \* On the east, by the coastline;
- \* to the north, by the Perch Hole Track to Cathie Creek, and the 4 Wheel Drive Track north of Dirah Street to the coast;
- \* to the west, from the Perch Hole up Cowarra Creek to include the Long Point Road subdivision, thence via Houston Mitchell Drive to Ocean Drive
- \* To the south, on the eastern side of Ocean Drive, by a line to the coast approximately half way between Bonny Hills and Lake Cathie Village.

It also includes an area which includes land west to the Long Point Road subdivision and south towards Bonny Hills.

### **A3. Process of Preparation**

During 2009 LCPA conducted an Open Day at the Community Hall where community members were invited to record their comments on various issues of concern. This data was then processed for inclusion in the Village Survey.

During 2010 LCPA carried out a questionnaire survey of the residents of Lake Cathie. The survey forms consisting of 115 questions were distributed by mail to every postal address in the village with 683 responses received.

## **B. BASIC INFORMATION ABOUT LAKE CATHIE**

Basic information about Lake Cathie, recent history, demographics, and present urban development is given next as a basis for professional planning.

### **B1. The History of Lake Cathie.**

**Aboriginal History;** Prior to European settlement in Lake Cathie early in the 19<sup>th</sup> century, our first residents were Aboriginal members of the Birpai tribe. Aborigines inhabited this area for many thousands of years, in fact our area has a well documented history of Aboriginal activities with Aboriginal sites still identifiable along our coastline. Indeed Annabella Boswell, the niece of Major Innes, in her diary recordings written in 1843 often refers to meetings she had with Aboriginal groups on her many visits to what she describes as Cattai Creek. The Birpai people were the original custodians of not only Lake Cathie, with their tribal territory extending to the south, to encompass the Manning area, to the north as far as the Macleay and west to the Walcha region. Although there is little evidence to be found around Lake Cathie in the way of artefacts or evidence of any permanent camp sites, several middens have been identified along the dune systems and a burial site has been reported on the northern headland. Historical photographs by Albert Dick, on display at the Port Macquarie Historical Society, depict Aboriginal communities present in Lake Cathie, well after the arrival of European settlers to this area.

## **European Arrival and Settlement:**

The first white men recorded on this part of the coast were led by Lieutenant John Oxley, who set out from Bathurst in May 1818 with a party of 16 men, 12 horses, 2 boats and a number of dogs, to follow the Macquarie River westward in search of the mythical inland sea. As a result of a series of disappointments, misadventures and miscalculations the party discovered the Hastings River instead, and arrived at the present site of Port Macquarie on October 8, 1818. On October 12 the explorers left Port Macquarie, named by Oxley in honour of the then Governor, and walked south, observing an extensive freshwater lake running for several miles behind the beach. It was on this day that Oxley became the first white man to see and record the existence of the freshwater lake that the Aborigines called Burrawan, writing in his journal:

*We quitted Port Macquarie at an early hour on our course homewards, with all these feelings which that world even in the wilds of Australia can inspire. We kept at a distance from the shore for nearly six miles; the country was exceedingly rich, the timber large with frequent brushes. Just before we came on the beach, we observed an extensive fresh water lagoon running for several miles behind the beach, bounded on the west by forest land of good appearance; a strip of sandy land about three quarters of a mile wide dividing it from the sea.*

They continued their journey south along the beach, before making camp at Bonny Hills. It would be reasonable to assume that these explorers were the first white people to visit Lake Cathie. As Geoff Armstrong notes in his writings about this event, the Lake entrance was obviously closed at the time to allow free passage across the berm at Lake Cathie. The Diary of John Oxley contains meticulous records of sightings and events of this trek, without any reference given to Lake Cathie. Curiously, no name was given to Lake Innes either.

## **The Innes Era**

Much more could be written on this subject and of the significance of this event in shaping our local history. However, the following brief history mainly relying on information sourced from records kept at the Port Macquarie Historical Society, should provide sufficient information to satisfy the scope of this document.

After a period of distinguished army service in Tasmania, Major Innes was sent to Port Macquarie as commandant in 1826. His period of stay lasted only 12 months, possibly due to rumoured indifferent levels of performance, and he was then dispatched to Parramatta, where he served as Police Magistrate for the following 2 years. After resigning his post, Innes arrived in Port Macquarie a second time with numerous Government contracts for the supply of bread, beef, mutton and vegetables etc for supply to the settlement. He selected 2,650 acres at Lake Burrawan, which he re-named Lake Innes, and by 1844 had acquired a string of other properties in northern NSW as well as in the Hastings area, in order to produce cattle and to grow crops to satisfy his supply obligations. Although an obvious entrepreneur by nature, as evident in his many ventures including brickworks, hotels, farming and shipping, his poor business acumen and his extravagant lifestyle would eventually lead to his financial demise in 1842. With the assistance of up to 200 assigned convicts, the actual homestead or mansion was constructed over several years, and was completed in 1831 on the property fronting the lake. The Estate in that

time was a hive of industry, as up to ninety convicts were engaged in the day to day manufacturing of bricks, dairy farm, butcher shop and bakery activities. Many other convicts were needed to tend to the pigs and fowls as well as attend to general farm and garden duties. In order to maintain this lavish lifestyle a myriad of servants were also required including cooks, maids and butlers, etc. to run the household. The lasting impact on the environment as a result of the Innes occupation will be long remembered. Apart from the mass clearing of the land to establish the estate, the escape of many foreign plants into surrounding eco systems, plants introduced to form the gardens and hedges, including Lantana, now costs the government millions of dollars annually to eradicate them from our bushland and environs.

Referring again to Annabella Boswell, a niece of Innes: she first documented the existence of Lake Cathie through entries in her Diary, where she makes mention of Cattai Creek and of her travels through Lake Cattai on various visits to the beach. There has been much speculation on how the name Cattai was given to our area, but as the name is an Aboriginal name for swampy land, it can be assumed that this is how the name was derived.

### **Settlement of Lake Cathie**

Regarded as a pleasure resort from the earliest days back to the times of the Innes era, Cathie Creek or just plain Cathie is still regarded by many people that way today. According to newspaper reports in 1905, Lake Cathie was fast becoming popular for amateur shooters and fishermen, with an abundance of game including wallabies, kangaroos and wild ducks, and of course, fish available. It was also reported that luscious oysters lined the creeks at that time. There was almost a permanent opening to the sea, with the entrance remaining open continuously from 1900 to 1920.

Early farming activities commenced sometime between 1900 and 1910, with a cattle run belonging to Walter Cunning operating on the southern shores of the lake. Another farm owned by Charlie Suters was also established on the south side of the lake and reportedly produced splendid crops of corn, pumpkins and melons. The Suters' hut on the PO Hill was one of the village's earliest structures.

Other market gardens were established on the south side of the village in the 1920s, and remained viable right up to the early sixties. The produce, mainly peas and beans, were a vital supply to the war effort, and there was even a small air strip to send produce quickly to the markets in Sydney and Newcastle.

A small commercial oyster growing business was established in 1908 and ceased around 1920, and about that time commercial fishing started to take place.

These early settlers were soon joined by other new settlers including Bob Pead who constructed one of the first permanent dwellings in late 1930. Bob Pead was granted permission to subdivide land on the south side of the village. The asking price of 100 pounds was readily accepted by prospective purchasers.

More permanent residences followed the opening of this subdivision and the real start of development within the village began.

The main access to the village was by way of a rough road leading to the highway, with access to Port Macquarie available by a sandy track, and only accessible if the lake was closed.

Like many new developing regional areas, the small community of Lake Cathie formed a progress association to organise volunteers to basically carry out the role of a Council in order to improve and advance their communities. Hastings Shire Council, with its main base at Wauchope, had many outlying communities in its jurisdiction, including Dunbogan, Laurieton, Kendall, Comboyne, Beechwood and Telegraph Point, as well as Lake Cathie and Bonny Hills. In that time the shire was predominately rural with a relatively low income stream from rates. Due to the low population and Council's financial constraints, many of these communities had to rely on the Shire Council to receive assistance from the State Government to provide the many services that the modern day communities now take for granted - services such as roads, street lighting, reticulated water service, street signs, garbage service, sanitation, etc.

The first Progress Association was formed in 1954. The Hastings Shire Gazette, in a news feature, described the Association in the following way; ***“ A small, but live band of residents backed up words with action “working bees” embracing males and females cleared Lantana, gravelled the road to the Pacific Highway, planted Kikuyu cuttings to the various camping grounds and reserves, supplied and placed lines for the Telephone line as well as other odds and ends. They have also planted and policed new saplings around the Lakes reserves and generally acted as a local Council.”***

Historical records kept by the Association refer to many requests to the Oxley County Council to have electricity connected. That occurred in 1957, although it appears that a phone service was earlier established around 1956. Then came water in 1958, and with it a real demand for land that had increased in price accordingly.

The first bridge across the estuary was built in 1961 with the help of the Association, who along with other community members provided a lot of the labour required in building this 4 span timber bridge. The bitumen road to Port Macquarie was completed in that time and coincided with the Council constructing a sealed road to the new Port Macquarie Golf Course.

The Progress Association lobbied hard to have a Post Office, which eventually opened in 1958 at the house of Bob Pead in Elanora Drive. It was then that the name of Cattai (pronounced as cat-eye) was officially changed to Cathie (still pronounced as cat-eye). Despite lobbying from the LCPA to have the pronunciation of Cathy, the pronunciation of cat-eye exists to this day. The spelling change was required so as not to confuse Cattai, near Windsor with our Cathie.

Prior to the amalgamation of the Hastings Shire Council and the Port Macquarie Municipal Council, Lake Cathie was administered by both councils. The Hastings Council boundary at one time took in a good deal of Port Macquarie, with its boundary in Swift Street. After 1950 the area was moved south to Lake Cathie and extended to all areas south of the main bridge, whilst the Port Macquarie Council started on the north side of the bridge. This amalgamation took place in 1981. The name was changed to Port Macquarie-Hastings Council in 2005.

A garbage service was not available until sometime in the 1960s, with residents having to drive to nearby temporary garbage tips, several miles from town. As a result, a lot of rubbish was illegally dumped in nearby bushland, including the area that now encompasses the village Sports Fields.

The only bus service that existed at that time was for school students travelling to Port Macquarie, with buses terminating at the bridge, as it was not strong enough to carry the weight of a bus. This arrangement was in place until the new bridge was opened in 1973.

In modern times the village of Lake Cathie has grown to a sizeable community. The village is reasonably well serviced with facilities and amenities, making it a desirable place to live. The community is strong, with many residents involved in the Progress Association and other community groups such as Landcare and Lions. Strong community support for LCPA has enabled it to continue to work for further improvements for all of the community.

## B2. Demographics

The 2006 statistics for Lake Cathie (data supplied from Australian Bureau of Statistics)

PERSON CHARACTERISTICS	Lake Cathie		Australia	
Total persons	2,736	-	19,855,288	-
Males	1,366	49.9%	9,799,252	49.4%
Females	1,370	50.1%	10,056,036	50.6%

In the 2006 Census (held on 8th August 2006), there were 2,736 persons usually resident in Lake Cathie: 49.9% were males and 50.1% were females. The age demographic is:

<u>AGE</u>	Lake Cathie		Australia	
Age groups:				
0-4 years	157	5.7%	1,260,405	6.3%
5-14 years	421	15.4%	2,676,807	13.5%
15-24 years	231	8.4%	2,704,276	13.6%
25-54 years	1,016	37.1%	8,376,751	42.2%
55-64 years	426	15.6%	2,192,675	11.0%
65 years and over	484	17.7%	2,644,374	13.3%
Median age of persons	43	-	37	-

In the 2006 Census 21.1% of the population usually resident in Lake Cathie were children aged between 0-14 years, and 33.3% were persons aged 55 years and over. The median age of persons in Lake Cathie (Suburb) was 43 years, compared with 37 years for persons in Australia.

<b>OCCUPATION (Employed persons aged 15 years and over)</b>	Lake Cathie persons	% of employed persons aged 15 years and over in Region	Australia persons aged 15 years and over in	% of employed persons aged 15 years and over in Australia
Technicians and Trades Workers	190	18.4%	1,309,258	14.4%
Professionals	175	17.0%	1,806,010	19.8%
Clerical and Administrative Workers	149	14.5%	1,365,805	15.0%
Sales Workers	143	13.9%	896,208	9.8%
Labourers	120	11.6%	952,520	10.5%
Managers	94	9.1%	1,202,267	13.2%
Community and Personal Service Workers	94	9.1%	801,906	8.8%
Machinery Operators and Drivers	54	5.2%	604,616	6.6%

In the 2006 Census, the most common responses for occupation for employed persons usually resident in Lake Cathie (Suburb) were Technicians and Trades Workers 18.4%, Professionals 17.0%, Clerical and Administrative Workers 14.5%, Sales Workers 13.9% and Labourers 11.6%.

<b>FAMILY CHARACTERISTICS</b>	Lake Cathie	%	Australia	% of total families in Australia
Total families	836	-	5,219,165	-
Couple families with children	301	36.0%	2,362,582	45.3%
Couple families without children	396	47.4%	1,943,643	37.2%
One parent families	134	16.0%	823,254	15.8%
Other families	5	0.6%	89,686	1.7%

In the 2006 Census, there were 836 families in Lake Cathie: 36.0% were couple families with children, 47.4% were couple families without children, 16.0% were one parent families and 0.6% were other families.

It is interesting to note that the increase in population from 1996 to 2006 was 962 or 96 per year increase. It is also interesting to note that in 1996 the percentage of residents over 65 was 28% as opposed to 17.7% in 2006.

### **B3. Urban Development to Date**

As at 2010, Lake Cathie still largely retains its 'small-village' atmosphere, with the newest housing estates Lakeside Woods off Kenwood Drive, and Endeavour Park, stretching from land adjacent to the Community Hall south to the village urban boundary, all but built out. Development is progressing more slowly to rural subdivisions off Houston Mitchell Drive to the area known as Long Point, where in recent times a local vineyard has been established. Beaches, waterways and recreation areas cater for holiday-makers and tourists, and toilets and other facilities are provided at a number of the more popular sites.

The range of housing for permanent residents extends from small, simple houses (some were weekenders in earlier days) to more sophisticated modern homes. The 2006 Census figures report that there were 949 dwellings, 46 duplexes and 97 apartments present in Lake Cathie at that time. The majority of the apartments cater for tourists and holiday makers in the village.

There are two retail centres, one fronting Ocean Drive north of the bridge, and a second south of it at the junction of Ocean Drive and Ernest Street which includes a large Woolworths supermarket, several specialty shops, and a Post Office. A licensed Tavern is also featured in this complex, all of which adequately caters for the needs of visitors and residents. Other developments include a Medical Centre, a Community Hall, a Church, a Day Care Centre, and a Fire Station. There is no school or hospital, at this stage, within the village. A licensed Bowling Club is located north of the bridge.

The village is well served with roads, all of which are sealed, but not all are kerbed and guttered. Reticulated water and sewerage services have been connected for many years. With the exception of some limited more recent developments, all power and telephone lines are above ground.

Sporting and recreation facilities, principally for adult use, are provided by Bowling, Football and Tennis Clubs. The population increase over the last 10 years has put pressure on the existing sporting grounds to adequately provide for many of the village's younger population. This subject is examined further in Section 5.

The public camping and caravan park (Jonathan Dickson Reserve) was closed in 1995 when efforts by Hastings Council to attract a lessee capable of bringing it up to an acceptable standard in an economically viable manner failed. Plans to convert the site to a day-use picnic area have since been completed, along with bush regeneration, and a stage of the planned shared pathway leading to Middle Rock Beach.

One aspect of urban development which has compromised subsequent management has been the decision by both earlier Councils, but particularly the old Hastings Shire Council in the Kenwood Drive area, to permit subdivision on land likely to be affected by the backup of water following heavy rain when the estuary berm is closed. Developments on such areas adjoining the waterway are subject to Council's Flood Policy, and its Greenhouse Policy. The former (Policy No. 69) initially specified that buildings on flood-prone land in the Lake Cathie area should have a floor level not less than the 100 year flood level (calculated at 2.5m. AHD). Subsequently a

freeboard of 500mm. was added, and in 1995 this was increased (following adoption of Council's Greenhouse Policy) to 800mm. As a result, habitable buildings in flood-prone parts of Lake Cathie can have floor levels ranging from 2.5m. to above 3.3m. Thus all dwellings should, in theory, be safe from flood. However, when the estuary berm is closed, some lots begin to go under water when levels not much more than 1.0m. are reached, and by the time the berm opening levels approved in the 1994 Estuary Management Plan (minimum 1.6m., optimum 1.8m.AHD) are reached, many more can be progressively affected. This regularly leads to pressure on Council from affected residents to open the berm before, or as soon as, the estuary level reaches the minimum 1.6m. AHD. Remedial action to protect these backyards, or to provide compensation to owners, will require consideration if the management of the waterway is not to be continually compromised as it is at present.

### **C. DEVELOPING A PHILOSOPHY OF MANAGEMENT**

From the 2010 village surveys, as well as the work of a number of LCPA organised working parties, a **Philosophy of Management** and a series of **Objectives of Management Principles** have been developed and revised to provide guidelines for more detailed planning. Each major issue and present or forecast problem in the village and its environs is then addressed in turn, and recommendations are made for action or further study as appropriate in the section dealing with **Management Policies and Strategies**. The major matters discussed in this section of the Plan are:

### **D. OBJECTIVES OF MANAGEMENT**

- \* To retain the quiet village atmosphere and to ensure that the village remains a harmonious safe community.
- \* To maintain, and where ever possible restore, the natural and scenic features of the area, paying particular attention to the importance and condition of the waterways.
- \* To monitor closely all proposed developments within the village and surrounds to ensure that all future developments do not impact on the character of the village.
- \* To improve community and cultural services for the residents and their families.
- \* To improve the sporting and recreational opportunities for all age groups, especially the younger members of the community, by ensuring facilities are adequate to meet demand.
- \* To encourage a wider range of recreational activities available for the less active members of the community.
- \* To foster a strong community spirit..



## **D1. ACCESS**

This subject must be addressed at an early stage of planning, because incorrect decisions about such basic things as the location or design of roads, or the premature provision of access to a site lacking adequate facilities, can easily compromise other aspects of management, especially when we are dealing with the interaction of community needs and natural resources. Often by the time a mistake has become apparent, the access pattern is locked in place, and it will be very difficult, if not impossible - for economic, social or political reasons - to change it.

There are already a number of examples of this truism in Lake Cathie. Ocean Drive Bridge is no doubt well located, but the design of its invasive approaches has had a significant impact on the waterway. Kenwood Drive Bridge and causeway - a quite undesirable piece of engineering, as direct access could have been constructed from Houston Mitchell Drive - have, because of location and design, effectively destroyed the value of the lake behind it for recreation and wildlife habitat, reduced the tidal prism, and affected the dynamics of the estuary. The design and construction standards of Aqua Crescent/Bundella Avenue are inadequate to meet the demands of holiday pressures for access to the beach, and to estuary swimming and fishing spots.

On the other hand, Middle Rock Road is an example of a site where premature construction of a good standard road before proper parking, traffic control, and visitor facilities could be provided, may well have caused overuse and severe damage to the natural values of the area. The low-standard, often pot-holed gravel road which now serves it has in fact acted to protect Middle Rock until its future can be properly planned and facilities provided.

### **D1.1 Getting to the village**

Because there is only one road (Ocean Drive) which provides final access to Lake Cathie from the outside world, it is of great importance to the community.

The 2010 Survey revealed general acceptance of the standard of the road leading from Lake Cathie to Port Macquarie, apart from the following comments:

The designated cycle lanes need to be completed along the entire stretch of the road to improve the safety of cyclists and motorists alike.

b) The surface requires more regular maintenance.

The section of Ocean Drive leading through the village area is the subject of a planned upgrade. This upgrade has been substantially delayed due to lack of available funding. In the interim a number of serious concerns regarding many dangerous intersections and drainage issues need to be addressed.

The section of Ocean Drive leading to Laurieton is regarded as sub-standard, and is in need of overdue upgrading. The absence of any designated cycle lanes makes this stretch of road unsafe for cyclists and motorists alike, and although the proposed lowering of speed limits will improve the safety of this road, upgrading to the majority of the road is urgently required.

## **D1.2 Planned Ocean Drive Upgrade**

The plans to upgrade the section of Ocean Drive that passes through the village entails a 4 lane main road, a 1.2m wide concrete footpath on the eastern side, and a 2.5m wide shared pathway on the western side. The road will also feature a 3m wide landscaped median strip to separate the traffic. A small section of this road will be on two levels.

Council's timing for this work extends from 2017 to 2035 and this is totally unacceptable with the planned developments in Area 14. The Association has lodged submissions for the road upgrade to be brought forward in line with population increases from the new residential areas.

### **Intersection details**

The plan includes roundabouts at the following intersections with Ocean Drive:

- A) Ernest St
- B) Fiona Crescent
- C) Aqua Crescent.

There will be a median strip placed on Ocean Drive to exclude entry into Tallong Drive and Melaleuca Avenue from Ocean Drive for south bound traffic. Traffic from Parry Street and Elanora Drive will not be able to turn right into Ocean Drive.

Boodgery Street and Orana Drive will be closed off from Ocean Drive.

**D1.3 Houston Mitchell Drive** is also of importance, for it connects Ocean Drive to the Pacific Highway, is the route to Wauchope and the west, and is often used as an alternative to travelling via Laurieton or Port Macquarie to points north or south. Results from the recent Survey indicate that this road is considered inadequate for the increased traffic volume that it now attracts.

Other comments regarding this road were recorded as:

- a) The road is not considered wide enough to cater for the mix of cyclists and large trucks.
- b) Potentially dangerous in the event of a bush fire.
- c) The surface requires more regular maintenance.

### **D1.4 Speed Limits**

The RTA is responsible for speed limits on these roads, and has previously determined that 80 km/hr is appropriate on Ocean Drive outside the village, and 50km/hr within Lake Cathie. The decision to reduce the speed limit may have been influenced by the strong support of the community following the polls conducted for the 2000 Master Plan, and subsequent continual representation by LCPA.

LCPA has also pressed for a 50 kph limit through the school bus stop at Abel Tasman Drive and in 2010 the limit from Miala Street to the motel was reduced to 70 kph and will be further reduced to 50 kph when the right turn into the Medical Centre is constructed.

The 100 kph limit from the motel to Bonny Hills was reduced to 90 kph in 2010.

## **D1.5 Internal Roads**

Although Lake Cathie is generally well served with internal roads, respondents to the recent village survey made reference to the following concerns:

- a) 77% of respondents agreed with the need to provide a safe pedestrian crossing to the northern shopping centre from the Foreshore Reserve. A crossing with refuge islands, similar to the Woolworths shopping centre is the preferred option.
- b) More street lighting in numerous areas, especially to existing pathways was a cause of concern, with 81% of respondents in favour of improved lighting.
- c) Footpaths - lack of, or improvement to - were repeatedly raised (these will be covered in Section 1.6 below).
- d) Further bus shelters were sought for the following locations:
  - \* The Medical Centre, with 83% support.
  - \* The corner of Lakeside Way & Kenwood Drive with 55% support.
  - \* The lake foreshore, opposite the northern shopping centre.The provision of bus time tables displayed within the shelters was also requested. The existing bus stop opposite Woolworths was considered to be too far from the shopping centre and ideally should be moved further north towards the pedestrian crossing.
- e) Information signs at the village entrances were recommended.
- f) Many dangerous intersections leading onto Ocean Drive were also identified, with the obvious need by Council & the RTA to address the situation in the interim, until the more permanent intersection measures that are planned in the Ocean Drive upgrade eventuate. Numerous comments received from our polling indicated that median strips and give way signs were favoured over roundabouts as a preferred intersection design.
- g) Speeding traffic in many of our streets, mainly Chepana Street, Tallong Drive, Abel Tasman Drive and Mullaway Road, are of major concern to residents and pedestrians.

The strength of local support for a pedestrian crossing on Ocean Drive to enable safe crossing for pedestrians to access the shops at the northern shopping centre requires action by both the Council and the RTA to rectify this situation, especially as traffic flows on Ocean Drive increase. As there is a possibility that the installation of zebra crossings would impede traffic movement during holiday periods and peak times, the erection of a pedestrian refuge in the centre of the road as a means of making crossing safer is worth considering as an alternative.

The erection of information signs on Ocean Drive north and south of the village is strongly supported. These should announce the name of the village, display a map showing features and facilities of importance to travellers and visitors, and provide information on local wildlife and the need for its protection.

The location and design of some internal roads has created traffic and safety problems which should be resolved as planning and funds permit. One example of this is on the southern side of the estuary, where Aqua Crescent/Bundella Avenue/Illaroo Road (which really constitute one road) provide access to major tourist points along the estuary foreshore and to the main beach, as well as to numerous residences and holiday units. Several formal parking areas and a long length

of informal parking space encourage drivers to back directly into the traffic when leaving, which can create havoc when large numbers have parked along these roads on busy days. The suggested introduction of a one way (N-S) circuit along Aqua Crescent - Bundella Avenue – Illaroo Road, although not generally supported in the Survey, might be one way to reduce these traffic problems and eliminate two dangerous corners, but would first require consideration of alternatives and of other planning issues, as well as more community consultation.

By far, the most dangerous road within our village is Tallong Drive. This stretch of road starts at Ocean Drive adjacent to the Bridge, then extends south to join up with Abel Tasman Drive, and eventually rejoins Ocean Drive south of the village. This road attracts large volumes of traffic, particularly mornings and afternoons when motorists from the large housing estates of Lakeside Woods and Endeavour Park are commuting to and from work. This road is both narrow and winding with many blind spots, and is totally inadequate in its present form. Attempts from Council to calm the traffic have failed to produce any significant safety improvements, with motorists regularly seen to be travelling on the wrong side of the road through blind corners.

Clearly this road requires substantial upgrading, including clearing of bushland to remove blind spots, general widening of the road, especially around corners, more median strips, and a formal pedestrian path. The Kenwood Drive intersection needs to be re-designed; this re-design should include a traffic island to stop traffic from turning into oncoming traffic. (More on this road in the Precincts Section)

A second example is the northern shopping centre, which was originally designed and approved as a motel, but was subsequently modified to house a miscellany of shops. There is a need to redesign the whole shopping centre and parking/traffic flow interaction, where pedestrians, through traffic, bus pick-up points, shoppers' parking, , and movement to and from the barbecues and estuary attractions opposite, create increasingly dangerous conditions at busy times. Such redesign might not be legally possible without the concurrence of the owners of the centre, but should be kept in mind by Council should ownership change, or redevelopment or change of use be sought.

Likewise, the development of a similarly congested situation seems likely near the southern shopping centre, where much of the beach traffic exits via Kywong Street. This, coupled with the increased traffic flows created by the Woolworths shopping centre, requires major design works such as a roundabout, to alleviate the present and future traffic concerns. The inadequate intersection at the Woolworths shopping centre requires rectification.

## **D1.6 Other Access Needs**

Results from both the 2000 and 2010 village surveys indicated that the lack of footpaths, either walkways or shared access ways, were a matter of major concern to residents. The time for Council to provide safe pedestrian areas for our residents and visitors is long overdue. Results from the 2010 Village Survey again strongly supported the provision of more footpaths within the village. The construction of a path from the northern shopping centre to the football field via the Bowling Club is requested, with 84% supporting this proposal. A pedestrian path from Middle Rock Road and Abel Tasman Drive leading to the Medical Centre is also requested, attracting 86% support, and the provision of paths along popular walks such as Aqua Crescent

and Tallong Road have all been sought in the survey. The reconstruction of the concrete path between the two shopping centres to remove its dangerous side-slope is urgently required. This subject attracted an 80% support to have this defective path urgently rectified.

The range of age classes, and in particular the significant numbers of very young and ageing in the community, should be noted from the demographic information provided above. Access facilities should be designed and constructed with their needs, particularly those of pram/wheelchair/gopher users, in mind.

Insofar as tourist walks are concerned, attention is drawn to the proposal originally put forward by members of LCPA and supported by the Birpai Aboriginal Land Council, the then Hastings Council and NPWS, for progressive construction of a major tourist walking track from Port Macquarie to Laurieton. This track could be constructed entirely on public lands, and development of the section through Lake Innes Nature Reserve has been formally proposed in the Management Plan for that area which was released during 1998.

Future tourist tracks to be developed in Lake Cathie should be linked to this concept, which it is expected will enter the village through Jabiru Reserve and exit at Middle Rock. Funding opportunities from the Department of Tourism should be investigated. There are four major tracks which come into this category:

- From the estuary south to Jonathan Dickson Reserve, thence through the littoral rainforest between the fore dune and Chepana Street, and then on to Middle Rock. This track has already been forecast in S2.1h below as a means of eliminating the many damaging tracks presently giving access to the beach along this stretch of coast, and of discouraging the development of more, south to Bonny Hills;
- From the housing estate in Kenwood Drive leading to the Community Hall along Tallong Drive. This track ideally should be designed as a shared use path, and would not only take advantage of the bushland reserve, but would provide an alternative to a conventional path on existing residents' nature strips. A link from Kenwood Drive to the Ocean Drive Bridge would also be desirable;
- Circumnavigating Cathie Lake itself. Such a track would have great attractions to birdwatchers and photographers, but would require NPWS investigation and support
- From Kenwood Drive to Houston Mitchell Drive along reserved roads and forest trails. This track would give walkers access to the forest road and trail system leading to Jolly Nose and Queens Lake, with possible extension to North Brother, and thence back to the Googik Track at Laurieton

**Bikeways** to and through Lake Cathie have been approved and funded as part of “The Hastings Council's Bikeways Plan”. At present there are no dedicated bikeways within the village, and residents expressed strong support for their construction in both the 1996 and 2010 surveys.

### Management Recommendations and Priorities

<b>ACCESS, ROADS &amp; PATHS</b>			
<b>Findings</b>	<b>Recommendation</b>	<b>Authority</b>	<b>Priority</b>
<b>Ocean Drive, from Lake Cathie to Laurieton; requires urgent upgrading.</b>	<i>Top priority in road planning should be given to widening and improving the present single-lane pavement of Ocean Drive between Lake Cathie and Laurieton; the provision of designated cycle lanes should be included.</i>	<b>RTA, PMHC</b>	<b>High</b>
<b>Ocean Drive, from Lake Cathie to Port Macquarie, requires the completion of the designated cycle lanes.</b>	<i>The completion of the existing cycle lanes on Ocean Drive between Lake Cathie and Port Macquarie is urgently required to improve the present dangerous conditions for both motorists and cyclists.</i>	<b>RTA, PMHC</b>	<b>High</b>
<b>Ocean Drive, passing through the village area, requires the planned upgrades completed within a reasonable timeframe.</b>	<i>Council must consider carrying out interim measures to address traffic &amp; pedestrian safety concerns to all areas of the village as a matter of priority.</i>	<b>PMHC, RTA</b>	<b>High</b>
<b>Houston Mitchell Drive requires upgrading &amp; maintenance.</b>	<i>Upgrading and better routine maintenance is required to Houston Mitchell Drive to cater for the increased traffic this road now attracts. Cycle Lanes are required.</i>	<b>RTA, PMHC</b>	<b>High</b>
<b>Tallong Drive, represents a highly dangerous road for pedestrians, cyclists and motorists.</b>	<i>Traffic concerns regarding Tallong Drive should be addressed as a matter of urgency.</i>	<b>PMHC</b>	<b>High</b>
<b>Pedestrian Crossings to various parts of the village are required.</b>	<i>A pedestrian crossing (or safe alternative) should be installed opposite the northern shopping centre as a matter of urgency.</i>	<b>PMHC</b>	<b>High</b>

<b>The Lake Cathie Local Traffic Plan (2004) should be updated.</b>	<i>As a matter of urgency, this plan should be reviewed to identify Lake Cathie's needs for the next 10 years. Council must consider carrying out interim measures to address traffic &amp; pedestrian safety concerns to all areas of the village as a matter of priority.</i>	<b>PMHC LCPA</b>	<b>High</b>
<b>Footpaths: there is an urgent need for more footpaths in the village.</b>	<i>An annual development programme should be commenced to satisfy this. Paths and roads previously constructed should be examined and where these do not already comply with acceptable standards, particularly for those with special needs, defects should be rectified.</i>	<b>PMHC</b>	<b>High</b>
<b>Cycle trails and tourist walks are requested.</b>	<i>Pathways around the village's reserves and waterways as identified in this plan should be investigated and constructed as funds become available.</i>	<b>PMHC Landcare LCPA</b>	<b>Medium to High</b>
<b>Information signs are required.</b>	<i>Information signs should be erected on Ocean Drive at the northern and southern entrances to the village.</i>	<b>PMHC</b>	<b>Low</b>

## **D2. THE NATURAL ENVIRONMENT**

### **D2.1. The Beach and Fore dune**

#### **2.1a) The Beach**

Due to the presence of a coffee rock layer which underlies the beach and dunes, and the assault of the sea during winter months, much of the beach sand is removed from the beach during that period and summer to winter beach levels can vary by as much as 2 metres. In some years (e.g. 1998/9 and 2008/9) these effects can continue towards and even beyond the end of the year.

Because of the changing nature of the beach and the reduced area often available for recreation - sometimes only a section from just north to not very far south of the entrance to the estuary - particular care must be taken to minimise incompatible activities on it.

As a result of major beach and dune erosion over the last 10 years, Council commissioned a study to determine the causes, and strategies designed to rectify the erosion problem. This highly controversial study has impacted greatly on residents living in Illaroo Road and Chepana Street. At the time of writing, this study has not been finalised with a decision on how Council intends to handle the situation still in abeyance. This subject is examined in more detail below in section 2.1c).

## **2.1b) Conflicting Issues**

One major source of conflict arises when Four Wheel Drive (4WD) vehicles arrive to share the beach with other users.. The causes of concern are obvious: the passive beach user generally takes exception to the presence of a vehicle (particularly as all sections of the beach covered in this Plan are easily accessed from nearby roads and parking areas) which he/she argues pollutes the air, disturbs the sand, offends the ears and eyes, threatens the fauna (molluscs, sea worms, sand-nesting birds etc.), and if carelessly driven, can endanger children. Although 4WDs are legally out of bounds between the present 4WD entry points near Dirah Street and at the northern end of Rainbow Beach at Middle Rock, not infrequently wheel tracks provide evidence of illegal use on this section of beach when sand conditions permit.

Unless approval to use 4WD vehicles on Lighthouse Beach is withdrawn, reconstruction and maintenance of the Dirah Street 4WD access (or its alternative) is essential to ensure that such vehicles are not taken into the estuary to exit the beach. Respondents to the 2010 survey gave a clear indication that vehicles should not be permitted on the beach south of Dirah Street to Bonny Hills (54% for and 23% against), while 68% indicated that if existing regulations are continued then better policing from council rangers is required.

The presence, or more often the evidence, of dogs on beaches is frequently another cause of conflict. Research shows that 42% of Australian households own dogs, and that 'walking the dog' is one of the most popular activities undertaken in open space areas. Although Port Macquarie Hastings Council has identified the beaches covered by this Plan as areas where dogs must be on a leash, this condition is often ignored, and evidence suggests that droppings are seldom removed. However results from the recent Survey indicate that dog owners feel that dogs should be allowed to use all sections of the beach and estuary at all times and be able to run leash free along the beach. Council will be releasing a new Dogs on Beaches Policy (due out in August 2010) and hopefully this legislation will satisfy the concerns of all the community. As indicated from the Survey any new legislation should be supported by better policing from council rangers. It is recommended residents check Council's website for latest information as this is an evolving issue with Council.

In both the LCPA Inc.'s 1996 & 2010 surveys, the need for a permanent site for a Lake Cathie Beach Patrol was strongly supported (82% for 6% against). At present a temporary hut is placed on the beach by Council prior to the summer holidays and removed at the close of the surfing season. The hut is manned by a Beach Patrol daily during the holidays, and at weekends outside them when necessary. Given the dangers of unmanned beaches on the east coast and the high loss of life which results from surfer ignorance or carelessness, a continuation of manning is justified. However, it would appear difficult to justify the establishment of a permanent clubhouse on a small beach of average surfing quality which is used by only a small number infrequently or for short periods, particularly when a suitable site would be difficult to find. The question of an improved site for the temporary surf patrol hut will be further considered in Section 7.

**Surf board riders**, on the other hand, favour the surf area immediately north of Middle Rock, no doubt because of the quality of its waves, plus its separation from other users. Access (via 'Rosie's Steps') and parking are presently adequate for their needs, which must however be considered if any changes are proposed in the Middle Rock area.



## **2.1c) The Dune System & Coastal Erosion**

### **Preamble**

Coastal erosion is not only a serious national problem it is also a serious problem for Lake Cathie, and in particular many residents who are faced with much uncertainty with the fear of severe property damage caused by storm damage as a result of erosion and recession to the dunes. They have seen their property values decrease by many thousands of dollars, and some live in fear of losing their homes to the sea. Hopefully, solutions contained in the Lake Cathie Coastal Study which are under consideration by Council will ensure that all residential property is successfully protected, and will alleviate the affected residents' fears. Coastal erosion has the potential to create long-term economic and social consequences, but it is important to understand and to determine the different causes and what can be done to manage it. The following information is an extract from the full document that can be found on our website.

“The coastline at Lake Cathie is subject to high energy wave climate during storm events, resulting in severe erosion to the coastline, and more recently the dune fields in particular. Private property and public assets are threatened with damage as a result of storm impacts and long-term erosion, however it must be stressed that there are no private properties under immediate threat at Lake Cathie at this stage.

“Beaches are constantly moving, building up here and eroding there, in response to waves, winds, storms and relative sea level rise. Healthy beaches have abundant sand. When sand supply is restricted, beaches will erode. Beach management, then, is actually "sand management." Beaches get sand from both the ocean and the land. Ocean currents can move sand along the coast to build beaches. Dunes and other landward sand deposits give sand to a beach in response to the forces of wind and waves. The sand can be moved to another beach, to the deeper ocean bottom, into an ocean trench, or onto the land side of a dune. The removal of sand from the sand-sharing system results in permanent changes in beach shape and structure. Sand that is removed from a beach can usually be traced to offshore sand bars or to inland sand dunes.

“There is movement of sand between these three areas of the beach environment. Transfer of sand between these areas does not represent sand loss. If sand is moved beyond the depth of about 15 metres it is said to be lost to the system.

“High waves will cause a beach to change shape (or profile). To absorb the additional wave energy, beaches and dunes give up sand to the waves, which carry it seaward and drop it on the bottom. This raises the sea floor and flattens the overall profile of the beach. Waves then shoal and break further offshore, minimizing their erosive effects. This typically happens in response to seasonal shifts in wave energy. Beaches recover from these natural changes when smaller waves move the sand back onto the beach and winds blow it into the dunes to be captured by coastal vegetation.

“Currently the ocean shoreline at Lake Cathie is being eroded by ocean waves as well as by groundwater seepage and other processes. The dunes have been subject to slumping caused by waves impacting the toe of the dunes as well as the hydraulic pressure of groundwater springs.

From the limited historical data available it would appear that this stretch of coastline has been stable for long periods of time, perhaps decades or centuries, then may suffer a sudden erosion event in a short time due to the weather or other changes.”

### **Comment on Climate:**

Studies have shown that the climate in the eastern coastline of Australia was quite severe in the 18th and 19th centuries, with numerous tropical storms affecting our coastline. During the middle part of the 20th century, when much of the coastal development occurred along the NSW coastline, the climate was more benign. However, since the late 1970s the weather pattern has become somewhat less mild, with winter storms, often spawned by El Nino, causing increased problems.

## **Coastal Erosion: Known Causes**

### **2.1d) The Effects of Wave Action on Erosion**

Waves are created by the transfer of energy from wind to the surface of the sea. As the strength of the wind increases, wave size increases, and frictional drag increases.

**Breaking point of wave:** the maximum energy is released when the wave hits the coffee rock barrier at the moment of its collapse. If it hits this rock before it breaks, less energy is released, since it never reaches the higher energy level. If the wave breaks before it hits the rock then the energy level is less since it loses energy travelling over the beach

**Wave steepness:** waves that are created nearer the coast are steeper and thus have more energy, whereas swell, which is created kilometres offshore, has less energy, and thus has less erosive capabilities.

**Depth of sea, length and direction of fetch, configuration of coastline:** the steeper the shelving of the beach is the higher and steeper the waves created. The longer the fetch, the more time the wave has to collect energy from the wind, hence the more energetic the wave. Headlands with vertical cliffs concentrate energy by wave refraction

**Supply of beach material:** although this material is used to erode the cliffs, a surplus actually absorbs some energy off the waves, conserving the cliff face.

**Beach Width:** the more beach material a shoreline has a readily available supply to, the wider the beach, hence the more protection the shoreline receives from erosion.

**Rock Resistance, structure and dip:** the strength of coastal rocks affects the rate of erosion. For example, our coastal areas where coffee rock was deposited are more erosive than most other areas with rock types normally found in coastal headlands, such as Middle Rock Beach.

### **2.1e) Erosion Landforms**

**Headlands and Bays:** these mostly form in areas of varying rock resistance. Firstly, the rocks of lower resistance are eroded, forming bays and leaving headlands where there are outcrops of more resistant rock, such as Middle Rock Beach. These headlands then receive the higher energy waves and thus a beach develops in the bay, further protecting it from erosion.

**Wave Cut platforms:** a wave cut notch results when a high steep wave breaks at the foot of a cliff. After many repeats of this procedure, the cliff collapses, and as is the case with coffee rock, caves are often formed as a result of this action.

### **2.1f) Transportation of beach material**

Up and down the beach, constructive waves deposit material on the beaches, whereas steep, destructive waves comb material back into the sea.

**Longshore (littoral) drift:** usually wave crests approach the coast at an angle that is determined by the local configuration of the coastline. This angle creates a near-shore current called longshore (littoral) drift. This is capable of moving large quantities of material in a down-drift direction. This drift is commonly in one direction. For example, at Lake Cathie there is a predominant movement of material northward. This action is the major cause of sediment loss.

### **2.1g) Sea-level rises**

Sea-level rise, wave and current impacts, and sediment deficiencies drive coastal erosion. Sea-level rise is thought to be averaging about 1.8 cm/decade at Lake Cathie, with data provided by IPCC (Intergovernmental Panel on Climate Change) suggesting a rise of 60 to 80cm by the next century. Sea level rise of this magnitude would cause the littoral system to shift landward by eroding the upland area, or in our case, the dune field. This natural process has been occurring since the last great interglacial 116,000 years ago, and sea level has both risen and fallen considerably since that time. The retreat of the shoreline, and associated loss of coastal lands, is the natural response of the beach to rising sea levels, and has been the underlying premise of coastal engineering theory for over thirty years. To assess the scope of changes in sea level, scientists have developed methods to interpret the geological record left by prehistoric events. One of the most useful markers for sea level studies has been the growth of coral. The coral is restricted to a growth zone within 2 metres of the sea surface. By observing growth patterns of this coral, direct information can be learned about sea level change over time. This approach is similar to the study of tree rings, which is used to learn about the age of a tree and the environmental factors present during the tree's life. Based on studies with coral, it is known that sea level has changed drastically over the last 11,000 years. Alternative views expressed on sea level rise by scientists and geologists not connected with the IPCC suggest that sea levels have become relatively stable in our region, apart from the known influence of El Nino events, the 18.6-year lunar nodal cycle, earthquakes, volcanoes, ocean floor subsidence, and high wind events and severe storm events as a result of atmospheric low-pressure cells. Any of these causes can contribute to coastal erosion. Other factors that have influenced sea level include size of polar ice caps and valley glaciers, which change the amount of water available for oceans and seas, rising and sinking of coasts due to plate tectonic changes, warming of ocean water which leads to increased volume for the same amount of water, and the increase in total water available in the ocean due to human activities which release groundwater and make it part of the surface water system.

The impact of the predicted flooding of coastal communities that may result from this change in sea level has become a major concern for all governments, worldwide.



Typical destruction and complete removal of dune during sand mining operations

### **2.1h) Human activities (anthropogenic)**

Certain human activities create significant sediment deficiencies and aggravate coastal erosion. These include sand mining, degradation of natural reefs, engineering structures such as bridges and stormwater outlets, and the loss of native vegetation due to pedestrian traffic and weed invasion. Bushfires can also destroy or alter dune vegetation.

Coastal barrier dunes are formed by wave and wind action. Waves bring sand to shore from the adjacent inner continental shelf, and it is transported landward by onshore winds. Obstacles, such as a sand fence or vegetation, reduce wind speed, causing sand to accumulate. As sand accumulates, plants adapted to the beach environment emerge, stabilizing the surface and promoting further dune formation. In the absence of stabilizing vegetation, blowing sand may leave the dune fields, return to the ocean, and be transported to other areas, such as nearby lake entrances. Dunes formed as a result of establishing vegetation act as flexible barriers to storm tides and waves, and serve as sand reservoirs for beach nourishment. During storms, sand erodes from the beach-dune system and redeposits as shallow sandbars offshore. In a stable beach- dune system, the sand moved offshore during storms is returned during calm weather. Thus, the dunes, beach, and near-shore sandbars act as a dynamic, integrated unit, often referred to as the beach-dune system. Although dunes serve as temporary protective barriers during storm tides of short

duration, they are not effective against persistent beach recession caused by rising sea level, migrating inlets, or changing shoreline dynamics. Therefore, they cannot be considered permanent structures that will "hold off the ocean."

The value of dunes and their fragile nature are often misunderstood or not appreciated. Excessive use often upsets the natural balance, damaging the vegetation and deteriorating the dune system. One of the earliest uses of dunes in Lake Cathie, which resulted in considerable damage, was sand mining activities. Today, weed infestation and other man-made causes already discussed pose serious threats to dune vegetation and dune stability. Intensive beach use increases the need to restore, construct, protect, and manage dunes.

### **2.1i) Engineering Structures & Lake Modification**

Modification and navigational channels can interfere with sediment transport. In 1933 a man-made drain was excavated to connect Lake Innes to Lake Cathie. The volume of flood waters that discharged to the ocean increased considerably. The volume and velocity of these extra flood waters created deeper channels, effectively destroying the system's natural sand reef's defence.

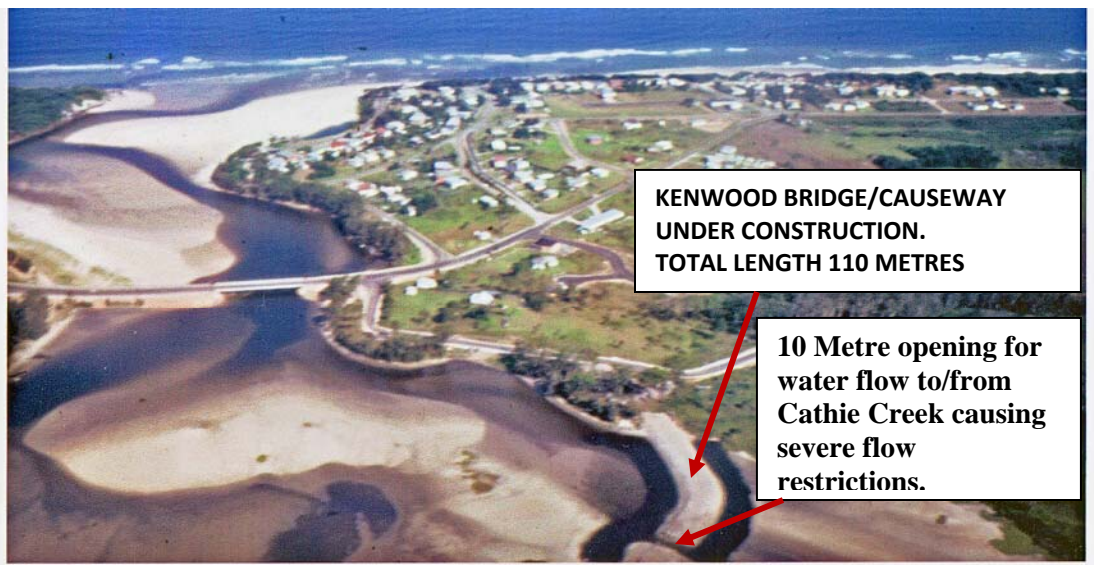
Sand moved by near-shore waves and currents is deposited in these artificial depressions, and is removed from the littoral system. Much of the sand removed has also shifted into the estuary at times when the lake has been open to the sea. Because of structures such as the main bridge restricting the flow of the outgoing tide, this sand remains in the estuary and is not returned to the beach system. The extra water that is discharged from the modified system, whenever the lake is open to the sea, also creates extra wave energy, resulting in waves impacting against the dunes, especially in adverse weather conditions.

Sediment movements throughout the lake and beach system are important in maintaining a consistent supply of sand within the system. Man-made structures such as bridges and training walls act as a barrier to trap sediment, leading to a deficit of sand returned to the beach. Much of the sediment deposits in Cathie Creek are a result of the main bridge design. This bridge, along with the associated training wall, has effectively altered and reduced the velocity of the main flow of waters entering the system from the catchment areas. From viewing the photo taken some 40 years ago the increase in sediment to both Cathie Creek and the lake entrance is noticeable.



**The Kenwood Drive Bridge** also restricts flow from Lake Cathie into the system, with sediment build-up increasing. The above photo also demonstrates the wider beach profile that existed at that time along Illaroo Road. Note also that the dunes in that area show no signs of erosion, although gouging on the north side is evident.

Armouring shorelines undergoing long-term retreat with structures such as revetments and seawalls halts coastal erosion, but refocuses the erosion onto the beach in front of the structure. This causes beach narrowing, a decrease in the useable beach width, and beach loss, the volumetric loss of sand from the active beach. Coastal armouring often aggravates erosion along down drift properties by decreasing the supply of sediment to down drift areas. The coastline at Lake Cathie has a natural defence barrier from the existing coffee rock layer. This rock layer varies in thickness, but is up to 2m thick, and it would appear that this layer extends well inland by several hundred metres. To date there have not been any detailed geotec studies carried out in the area to determine the extent of this rock. Over time, this barrier itself is subject to erosion, unless protected with sand or some synthetic barrier. The presence of this rock also works against nature to some degree, as this semi-monolithic barrier acts a little like an artificial sea wall, causing a net loss of sediment and beach narrowing. Another problem this rock presents occurs after heavy rainfall when sub-surface ground waters collect and flow along and through the strata. This action causes slumping and instability of the dunes with a resultant loss of sand. These ground waters are particularly damaging when they are in a concentrated form. Drainage water enters the strata through rock crevices and often concentrates to actually form springs with a high velocity and considerable hydraulic force. The absence of vegetation compounds this damage as vegetation takes up ground water through transpiration. Vegetation, especially native vegetation, lessens the impact of this naturally occurring action by binding the soil with its root structure.



**Kenwood bridge construction. 1972-1973 Image**

**NOTE: Width of original water flow has been drastically reduced by this ill conceived piece of engineering**

**GRASS GROWTH ON SAND ISLANDS**

**In this 1970's image NO grass grew on the sand islands in this section allowing sand to move. Since then permanent grass growth has caused the islands to become permanent structures.**

### **2.1j) Stormwater Outlets**

The current stormwater outlets placed along the beach suffer from structural damage as a result of past storms, poor maintenance and poor design. These damaged outlets have caused erosion to much of the surrounding soil profile that once supported these structures. The direct outflow exiting the stormwater pipes has led to further erosion, scouring, and water logging of the embankment areas surrounding the outlets.

This action, when accompanied by sub-surface drainage following the coffee rock layer, has effectively destabilised large areas of the dune field, with widespread erosion mitigating along the entire coast from Middle Rock Beach to the Lake entrance. Council has repaired some of these outlets as an interim measure and intends to complete the repairs when funds become available. This interim measure is only intended as a short-term fix, as the only acceptable method of disposing of stormwater is through retention basins and stormwater ponds.

The many contaminants found in stormwater are having a significant adverse impact on water quality in coastal areas across the nation. Many important ecological and economic resources, including beaches, shellfish areas, fisheries, and wildlife are at risk from these contaminants. The ocean is the ultimate collector of all the pollutants that run off lands and urban streets. What we once thought of as a vast expanse capable of assimilating our wastes is showing extraordinary signs of stress, most evident along the coastlines.

### **2.1k) Weed Invasion**

Like most of the coastline of NSW, the Lake Cathie coastline, especially in the dune fields, has been subject to the loss of native vegetation. The main cause of this destruction is from the spread of the weed known as Bitou Bush (*Chrysanthemoides monilifera*).

Bitou Bush is an aggressive weed in coastal dune vegetation where it can out-compete, and in many cases totally eliminate, the native flora. The invasive success of Bitou Bush is due to its vigorous growth and prolific seed production. Bitou Bush grows faster than many native plants and is free of pests and diseases, giving it a competitive advantage over natives. It forms a dense green blanket which can prevent native tree seedlings from growing. Plants which climb into small trees such as banksias can make these trees so top-heavy that they are blown over or snapped off in strong winds. When it forms such dense stands it destroys or drastically alters the habitat of many native birds and animals as well. Bitou Bush usually occurs very close to the sea, on dunes, sea-cliffs, and in forests on sandy soils. It was promoted for erosion control on coastal dunes in the 1950s and 60s. It will invade grassy or healthy headlands, coastal Banksia scrub on dunes, dry eucalypt forest and littoral rainforest. Bitou can produce seed within one year of germination, and seed production is prolific (up to 50,000 seeds per plant per year). Seeds can remain viable in the soil for up to 7 years, resulting in the accumulation of a massive soil seed bank. Germination is stimulated by fire or other disturbance, and after passing through a bird gut. The potential for native vegetation to be overwhelmed in areas where Bitou Bush occurs is very high. Bitou Bush destroying the entire Lake Cathie coastline was left unmanaged by Council for decades. Recent combined efforts by Council and the local Landcare group has seen a significant reduction of this damaging weed with successful bush regeneration restoring much of the affected coastline behind the dunes.



## **2.11) Recommendations for improved Management of Coastal Erosion at Lake Cathie**

**PROTECTION OF PUBLIC LANDS:** This is not included in Legislation passed by NSW Government in October 2010 – LCPA will continue to press for this inclusion as it involves Illaroo Road, Jonathon Dickson Reserve and Littoral Rainforest north of Middle Rock.

### **Beach Nourishment & Dune Reinstatement**

Beach nourishment, a technique used to restore an eroding or lost beach or to create a new sandy shoreline, involves the placement of sand fill, with or without supporting structures, along the shoreline to widen the beach. It is the only management tool which serves the dual purpose of protecting coastal lands and preserving beach resources. Beach nourishment is a common management practice in most parts of the world.

Beach nourishment requires large volumes of beach-quality sand. The initial nourishment project typically requires thousands of cubic metres of sand per kilometre of shoreline, and most beaches need periodic renourishment. Fortunately Lake Cathie has a vast supply of suitable sand deposited within the lake entrance area available for beach nourishment and dune profiling. That is not to say we should not take measures to more effectively manage our sources of readily available sand, and should not build capacity to tap new, currently unavailable sources of sand.

Beach nourishment is the only management tool that protects coastal development without degrading the beach. Preserving or restoring a sandy beach has direct, beneficial impacts on recreational opportunities and property values. A pilot project is very much needed. It would illustrate the engineering requirements of nourishment, as well as address all the environmental and permission requirements, problems, and concerns. An action plan for a pilot beach nourishment project should be prepared as part of the Lake Cathie Coastal Study.

As previously stated, sand dunes are important components of the littoral budget. Dunes trap windblown sand, store excess beach sand, and serve as natural erosion buffers, protecting beach-front property and coastal infrastructure during storms and high-wave events. Pristine dunes are vegetated by native plant species such as Beach Fescue, Dune Sedge, Coastal Wattle and Coast Banksia, to name a few. All of these species are salt-tolerant, have dense root systems, and are effective wind-breaks and wave buffers. Healthy sand dunes are vital to the health of the beach and near-shore marine environment. Because of the natural erosion buffer that coastal dunes provide, dunes should be preserved, and in all cases restored as a matter of priority.

### **Restoring the Natural Environment**

Lake Innes should be isolated from Lake Cathie and returned to a freshwater lake.

### **Correction of Past Unsustainable Developments**

The Kenwood Drive Bridge should be extended in length to restore natural flows. The Ocean Drive Bridge should be extended back to the original shoreline to return the natural flows. Selective dredging to remove sediment build-up is required to restore natural flows.

### **Limit Development**

Council and State Government have taken this initiative to restrict development on top of or in front of these dunes at Lake Cathie. Full consideration should be given to existing residents within in this area to properly examine what, if any, influence their residences are impacting on



the erosion, and to then review the current restrictions imposed on these residents. Council must move to have their own house in order by immediately repairing the damaged stormwater outlets. A comprehensive plan to dispose of stormwater in an environmentally sustainable way should be commissioned.

**Sand Mining**

Prohibit any future plans involving grading (levelling) or mining of coastal dunes.

**Formal Pathways**

Establish moveable dune walkovers and barriers to provide pedestrian access without trampling dune vegetation.

**Dune Reinstatement**

Encourage and support dune restoration efforts (dune fencing, revegetation, sand nourishment, etc.).

**Public Awareness**

Publish a handbook detailing the methodology for future dune restoration projects. Public awareness can also be increased through educational presentations to various groups (e.g. community associations, service clubs, ocean activity groups and school students).

Data from the 2010 Survey regarding the Beach revealed that 93% of the respondents want Council to immediately repair the faulty stormwater outlets to the beach; 84% support the proposal to have surplus sand removed from the lake entrance and used to reinstate the dune fields.

**Management Recommendations and Priorities: The Coastline & Dunes**

<b>Findings</b>	<b>Recommendation</b>	<b>Authority</b>	<b>Priority</b>
<b>A Coastal Restoration Plan is required to re-instate the eroded dune fields.</b>	<i>Council should fully consider all of the recommendations contained in the Plan as outlined and include them in a Coastal Restoration Plan</i>	<b>PMHC</b>	<b>High</b>
<b>The dune fields require reinstating in accordance with The Coastal Management Manual.</b>	<i>Every effort by Council should be made to work with Landcare to reinstate the dunes. Residents should be actively encouraged to volunteer the small amount of time which, cumulatively, has already made a significant impact on damage caused to the dune system.</i>	<b>PMHC Landcare</b>	<b>High</b>

<p><b>The current stormwater outlets placed along the beach require immediate rectification.</b></p>	<p><i>These damaged outlets have caused erosion to much of the surrounding soil profile that once supported these structures. Council are requested to carry out remedial works as a matter of urgency.</i></p>	<p><b>PMHC</b></p>	<p><b>High</b></p>
--	---	--------------------	--------------------



Loss of beach in front of Illaroo Road 2008.



### Damaged Storm Water Drains

#### Management Recommendations and Priorities: The Beach

<b>Findings</b>	<b>Recommendation</b>	<b>Authority</b>	<b>Priority</b>
<b>4WD vehicle activity on Rainbow Beach is a concern to residents and beach users alike.</b>	<i>Monitor and strictly enforce restrictions on the use of the beach by 4WD vehicles between the Dirah Street 4WD access point and the northern end of Rainbow Beach, to ensure that there is no risk to, or conflict with, passive recreation beach users.</i>	<b>PMHC</b>	<b>Medium</b>
<b>Dogs should not be allowed on the beach entrance area or in the estuary.</b>	<i>Monitor Councils new Dogs on Beaches Policy in the Lake Cathie beach and estuary area with respect to area covered, period of application, regulatory controls, and procedures for enforcement.</i>	<b>PMHC</b>	<b>High</b>

<p><b>A permanent site for Lifeguards needs to be planned for.</b></p>	<p><i>Continue to review the need for a site on which facilities can be located to ensure the continuation of regular summer season Beach Patrols at Lake Cathie.</i></p>	<p><b>PMHC</b></p>	<p><b>Medium</b></p>
--	---	--------------------	----------------------

## **D2.2 The Estuary & Waterways**

There is no doubt that the major tourism and recreation attraction in Lake Cathie is the estuary. The dynamics of the estuary must be considered in conjunction with those of the remainder of the waterway, discussion on which follows below. The management of several specific foreshore sites which adjoin the estuary and provide recreational opportunities is discussed in Section 7 - 'Precinct Plans'.

At this stage it should be sufficient to stress the urgency of the problems which are associated with the estuary, some of which will hopefully be reviewed through the EIS which will be a statutory pre-requisite to the closure of Lake Innes.

### **The Reversion of Lake Innes**

#### **Brief History:**

Prior to 1933 Lake Innes was not part of the Cathie estuarine system, but was a separate freshwater lake before it was deliberately drained.

Lake Innes was of State, if not National, significance as a coastal freshwater habitat. With permanent islands and other floating vegetation, and complex margins of Melaleuca forest and reeds, the lake provided safe nesting habitat for a variety of birds, and was once the largest freshwater lake on the NSW coast. A feature of the freshwater lake was its abundant and diverse water-bird population.

In 1929 local conservationist, Albert Dick recorded up to 10,000 Hardhead Ducks and well over 2,000 breeding Pacific Black Ducks on the lake. He also recorded large numbers of other species of avifauna including Black Swans, Chestnut Teal, Australasian Shovelers, Eurasian Coots, Swampheens, Black-necked Storks and Comb-crested Jacanas, prior to the saline intrusion.

The proposal to drain Lake Innes in order to reclaim land for grazing and farming had been first put forward in 1905; however it was not until 1933 that the fatal project was approved and carried out. The decision to approve this controversial project could only be described as bureaucratic bungling that resulted in a complete failure to achieve its objective.

Not only did the draining of the lake virtually wipe out the avifauna, and alter and destroy the ecosystem, it has also rendered the lake almost incapable of supporting any marine life whatsoever.

The proposal to revert Lake Innes to fresh water has been mooted for a number of years.

The NPWS has been attempting to have funds made available in order to conduct a full Environmental Impact Study to determine the feasibility of reverting this lake to fresh water. This move is supported by the Port Macquarie Hastings Council and LCPA as well as numerous conservation groups. The 2010 Village Survey indicates that the community of Lake Cathie also supports this move, with 58% in favour as opposed to only 13% against.

The proposed EIS would need to examine the many complex issues associated with the proposed reversion to ensure the success of the project, but hopefully a mutual benefit to both lake systems is achievable. Some of the benefits are as follows:

**Advantages - Lake Innes:**

A reversion to fresh water will increase the available fresh water on the mid-north coast from 40 to more than 700 hectares, and will provide a secure permanent breeding habitat for many water-birds which are currently listed as threatened species. It will also provide a drought refuge to those water-bird species restricted to fresh water. A freshwater lake will also result in a higher biomass of aquatic vegetation and a more complex lake margin. This in turn will lead to more species diversity, an increase in frog and turtle species, and an expansion of the food supply for micro-bats and birds. Eric Claussen from NPWS, in supporting the reversion, makes mention of the opportunities to study ecological succession in the process of the reversion from a saltwater to a freshwater ecosystem. It would also provide opportunities for scientific study of coastal processes, particularly in relation to geomorphology, wetlands and fauna.

**Advantages - Lake Cathie:**

The proposed reversion would not only benefit Lake Innes. Isolation from Lake Cathie has the potential to correct past lake modifications which have had an adverse effect on Lake Cathie.

Relying on information from various waterway studies, Lake Cathie could benefit from:

- a) Improving ocean entrance stability.
- b) Increasing the number of entrance openings from average one per year to three.
- c) A possible increase in lake-bottom faunal communities and in sea-grass and mangrove communities in response to more stable water quality and to greater tidal range.
- d) Movement of fauna (koalas) would be restored across the levee, as experienced prior to the drain construction.
- e) The need to dredge to remove excess sand build-up to the lower estuary would be less frequent.
- f) More frequent openings would result in a narrower flood channel and reduce the erosion to the southern headland.



## References

The Lake Innes-Lake Cathie Catchment Study- *Colin Creighton 1983*

Lake Cathie/Lake Innes Estuary Management Plan 1994- *Webb,McKeown*

Tale of two lakes 2003- *A Umwelt*

Lake Cathie/Lake Innes Estuary Management Study1995- *Webb, McKeown*



Estuary and new bridge 1973

## Entrance Management

Ocean entrance of the system is regularly closed due to natural accretion of sand. Port Macquarie-Hastings Council has a policy of opening the entrance when the water level reaches 1.6m Australian Height Datum.

There is some pressure on the seasonality of entrance opening – most efficient for the estuary is over the winter months. However there is pressure to have the entrance open over the summer months to benefit tourism and recreational requirements.

The entrance opening regime impacts on waterbird breeding habitats, migration of fish and prawns in and out of the estuary, flood risk for existing development in Lake Cathie, and estuary flushing regimes.

Scenario options:

1. No change, continue with current policy.
2. Modify policy to open entrance at 1.8m.
3. Modify policy to open entrance at 1.4m.
4. Full natural opening process.
5. Open entrance at all times

On the question whether the existing lake opening policy should be reviewed, 90% agreed, with only 2% disagreeing.

The survey also enquired whether the respondents thought the Kenwood Drive Bridge should be extended, with 80% agreeing that it should, and 3% against.

Although the question of the role the main Ocean Drive Bridge plays in reducing tidal flows was not put, plenty of comment supporting this notion was received.

On the topic of stormwater still entering the lake unrestrained, 87% agreed that this drainage should be entering the lake via a pollutant trap.

It must be stated that, in the case of waterway management, there are entrenched differences of opinion between the residents and Council as to the impacts of past decisions. Put simply, the majority of residents, along with the LCPA, are convinced that human actions over a long period - the opening of Lake Innes, increasingly frequent berm openings at a low level, and the construction of bridge approaches which impede stream flow - have resulted in a build-up of sediment and a deterioration of the waterway, which will only be remedied by deliberate changes to existing structures or practices.

On the other hand, Council, through its adoption of the 1994 Estuary Management Plan, in effect supported its consultants' view that *the morphology of both lakes has been stable....over 53 years, and that ....change appears largely a reworking of existing bed sediments rather than the infeed of additional sediments.....* If the latter view is correct there would be less justification for the changes sought by the residents, and whilst these contrasting beliefs exist it will remain difficult for residents and Council to achieve agreement on management priorities necessary to restore the waterway.

The LCPA has prepared a fact sheet and policy regarding this subject which can be viewed on our web page [www.lakecathiepa.com](http://www.lakecathiepa.com). An excellent history of the lake system, titled “ Lake Innes (*a Challenge For Community Involvement*)” and written by the original author of the 2000 Master Plan, Geoff Armstrong, is also available from the Port Macquarie Historical Society.

## Management Recommendations and Priorities: The Estuary & Waterways

<b>Findings</b>	<b>Recommendation</b>	<b>Authority</b>	<b>Priority</b>
The joining of Lake Innes to Lake Cathie has proved to be an environmental disaster.	<i>Support the NPWS recommendation that the closure of Lake Innes and its conversion back to a freshwater system be reviewed through the preparation of an EIS.</i>	LCPA	High
Past modifications to the waterways are impacting on the health of the estuary.	<i>Estuary problems which are affected by the overall dynamics of the waterway system should be considered in the EIS which will examine the closure of Lake Innes.</i>	PMHC	High
Recommendations from previous lake studies have all but been ignored by Council.	<i>Dredging of Cathie Creek, Cathie Lake, and the 'reverse delta' must be seriously considered as options in the EIS on the closure of Lake Innes, regardless of existing departmental policies and/or any ethical problems that such action might introduce.</i>	PMHC	High
Despite the current Lake Opening Policy sediment build up (accretion) in the lake is increasing.	<i>Review the Lake Opening Policy,</i>	PMHC	High
Nutrients and potentially dangerous pollutants are entering the estuary.	<i>Pollutant traps are required to all unprotected stormwater drains currently discharging into the lake.</i>	PMHC	High
Improving the overall health of the lake is paramount to increasing fish stocks.	<i>Any plans to establish a Marine Park within the estuary system of Lake Cathie should be abandoned.</i>	NSW Gov	High



## **Recreational use of the estuary**

The State Government has introduced Marine Parks to several locations along the coast, with Lake Cathie being mentioned as a possible future site for consideration.

The LCPA is opposed to any sort of restriction on recreational fishing, instead arguing for urgent remedial works to restore the health of the lake, along with the reversion of Lake Innes. In our survey it can be revealed that there is only 11% support for a Marine Park as opposed to 75% against.

The survey also recommended that professional fishing should be excluded from the estuary, with 80% for, and only 11% against.

Other specific problems associated with sites adjoining the estuary will be addressed in Section 7 of this Plan.

## **D2.3. The Terrestrial Landscape**

Although perhaps not considered by many to be as important as the beach and waterway environments, the terrestrial landscape of Lake Cathie makes a highly significant contribution to the character of the village and the welfare of its residents and visitors. This subject was raised in our recent Survey with residents generally agreeing that improved street scaping throughout the village would be desirable, with 55% for, as opposed to just 9% against.

Unfortunately this contribution, which can be enhanced through the beautification of roadsides, the aesthetic improvement of public areas, and the protection of wildlife and associated habitats, is frequently overlooked when other planning issues or the provision of services are being considered.

Although there is only one formal koala reserve in the village (immediately west of the L.C.Bowling Club), the native vegetation on reserves and roadsides throughout the village is regularly used by these animals. But there is a need for more, as development increases, for forage, as a means of escape from domestic dogs, and to provide corridors which will facilitate the movement of native animals between the habitat within the village and the nearby forest. This dearth of wildlife corridor trees is greatest along virtually the full length of Ocean Drive; in the north east (Boodgery to Evans Streets); and in the subdivisions to the south west of the village (to link Fiona - Endeavour - Houston Mitchell Drive areas). Another area where koalas are known to exist is the portion of land owned by the NSW Education Dept on the corner of Fiona and Ocean Drive. Left in its present state this bushland provides a corridor for koalas and other wildlife, effectively linking to the lake reserves along Tallong Drive. Representation by LCPA, supported by the Port Macquarie Koala Preservation Society, to the owners of the land to have all or most of this highly environmental land retained in its present condition is ongoing with no real success at this stage.

The move to have this land set aside for environmental use as opposed to further development was put to the recent poll, with 50% for and 22% against, whereas when the question was posed as should the land be still considered for use as a Primary School, 40% disagreed, with 38% agreeing that it should. Perhaps both can co-exist, subject to favourable ecological investigations being carried out.

Through the efforts of the local Landcare group and Council, a large portion of bushland has been successfully regenerated in the Crown Reserve behind Chepana Street, with wildlife and in particular bird species returning to that area. This massive bush regeneration project stretches from Jonathan Dickson Reserve to Middle Rock Beach and is ongoing.

Over the years Lake Cathie has been well served by a Tidy Towns Committee. This small band of enthusiastic people contributed greatly in retaining and improving the natural beauty of the village. Unfortunately this group no longer exists, and the prospect of reforming such a group was posed in our recent Survey, with 51% supporting the move, and only 7% against. The fact that 42% were neutral indicates that many of the numerous benefits that the village has obtained in the past, as a result of The Tidy Towns Committee, may not have been fully appreciated.

Wildlife warning signs for both koalas and kangaroos (which are frequently seen, and are occasionally killed by cars along Ocean Drive, particularly north but also south of the village) should be maintained on all major access roads. The diminishing koala population is of great concern, and consideration should be given to the provision of wildlife information signs at appropriate locations (eg. village entry points or selected reserves).

### **Management Recommendations and Priorities: The Terrestrial Environment**

<b>Findings</b>	<b>Recommendations</b>	<b>Authority</b>	<b>Priority</b>
<b>A review of roadside planting to the village is required to maximise aesthetic &amp; wildlife habitat values.</b>	<i>A committee appointed by and with the authority of Council should be formed. A Tidy Towns Committee should be formed from concerned community members.</i>	<b>PMHC LCPA</b>	<b>Medium</b>
<b>Deaths to many native wildlife species regularly occur within the village.</b>	<i>Signposting to provide information on or protection of wildlife within and adjoining the village should be reviewed regularly.</i>	<b>PMHC</b>	<b>Medium</b>

### **D3. URBAN DEVELOPMENT**

#### **D3.1 Planning and Development**

The residents of Lake Cathie have expressed an overwhelming desire to retain the present character of the village. Whilst it is acknowledged that future development to Lake Cathie is inevitable, changes to the village brought about by an increase in population ideally should bring benefits to the community and not detract from the village's character. All future proposed local developments will need to be very closely examined by the community to ensure that the village is never compromised with any undesirable types of development. It is not only an increase in the population from local developments that will impact on Lake Cathie- the general population increase to the LGA will also play a significant role. A large proportion of visitors to the village are predominantly day trippers from surrounding areas. Past surveys revealed that the majority of people visiting the foreshore reserve were from nearby areas such as Port Macquarie, as well other surrounding areas. Therefore this Plan needs to examine the likely impact of forecast population increases to the entire LGA, in order to fully understand and plan for the extra people movement throughout the village.

The Port Macquarie-Hastings Local Government Area (LGA) contains a current approximate population of over 70,000 residents within an area of approximately 368,100 hectares. Urban development within the LGA is diverse, ranging from Greenfield Rural-Residential Subdivisions to High Density Mixed Commercial/Residential Flat Buildings. Historic development of the area has led to most urban development being focused on the city of Port Macquarie and coastal satellite villages of Lake Cathie, Bonny Hills and Laurieton/Camden Haven to the south. To the west, however, Wauchope on the Hastings River has also experienced above state average growth rates.

Population forecasts indicate that the population of the Port Macquarie-Hastings is likely to grow by a further 33,220 persons between 2005 and 2025. A majority of this growth will be distributed between the subdivision areas of Lake Cathie and Bonny Hills and Thrumster/Sancrox. A significant proportion of this growth will be attributable to net immigration of retirees, persons aged over 55 years, and to a lesser extent, young families.

New residential developments planned for Lake Cathie include a manufactured home village that will, when completed, consist of 257 dwellings, resulting in 550 or so extra residents for Lake Cathie. The location of this proposed development is just south of the village, and will front Ocean Drive. This development is council approved, with work planned to commence late 2010. The other large housing estate is also located south of the village on land south of Middle Rock Road. This development, which extends to Bonny Hills, will consist of approximately 700 house lots, with the potential to house an extra 2,000 residents. Although both these developments will include a variety of infrastructural components within their own confines, they will no doubt generate an increase in demand for public facilities and services to be provided by Port Macquarie-Hastings Council. These developments will have the potential to alter the current Lake Cathie village environment.

Development contributions generated by these new developments should make a reasonable contribution toward the future provision of new and/or augmented facilities within the village.

The facilities, which the Port Macquarie-Hastings Council will require in order to adequately cater for the extra population, include the following:

- \* Extra sporting fields
- \* Extra parks and picnic facilities
- \* Extra children's play grounds
- \* Police Station
- \* Library Facilities
- \* Surf Life Saving Equipment and Facilities
- \* NSW Fire Service – Infrastructure and vehicles
- \* State Emergency Service – Infrastructure and vehicles
- \* Ambulance Station

### **Car-dependent communities**

All the above requirements will need to be supplemented with additional upgrades to the existing road network, along with extra parking spaces to cater for the anticipated extra vehicular movement within the village. The distance from the new developments to the main shopping precinct and the popular waterside reserves will require the use of a car.

Walking and other methods of transit, although encouraged, are not always practical, especially due to the lack of formal cycleways and paths throughout the village. Existing parking facilities to the Woolworths car park will need to be extended, and an improved formal intersection with better access and egress arrangements employed. The existing formal parking spaces to the Foreshore Reserve are inadequate, and extra car parking areas will be required. Similarly there is a severe shortage of formal car parking spaces along the Aqua/Bundella Avenue Reserve areas, and additional parking spaces will be required. Extra parking spaces to the Bowling Club and Tavern may also be required as a result of the predicted extra patronage.

### **Proposed Light Industrial Area**

The forecast added population increase will most certainly require new infrastructural amenities such as a Light Industrial Area to provide basic service industries for the Lake Cathie/Bonny Hills area. Service industries currently unavailable to our immediate area include mechanical repairs, hardware and trade stores, smash repairs, auto electrical and the likes. The inclusion of a Waste Transfer Depot should also be considered.

Port Macquarie-Hastings Council has identified the land at the corner of Houston Mitchell Drive and Ocean Drive, after rezoning, to be suitable for that purpose. This proposal has met some strong opposition from both the Bonny Hills and Lake Cathie Progress Associations. They were joined by nearby residents and NPWS in opposing the proposal. They argued that this site was not identified in the Hastings Urban Growth Strategy (HUGS), and there had been no community consultation regarding its selection. They also argued that this land adjoins Queens Lake State Conservation Area, and is a prominent 'gateway' to the villages of Bonny Hills and Lake Cathie, when entering from the main highway. Bonny Hills Progress Association pointed out that this site also has visually significant vegetation noted in the Lake Cathie and Bonny Hills Urban Design Master Plan, adopted by PMHC in 2004, and as well, this land is subject to flooding.

Council, in supporting their proposal, claim that their strict development requirements, including screening from the street and strict landscaping practices, will ensure that there will be no detrimental effects on the environment, and no detraction from the amenity of nearby residents. They also point out that the new Country Energy Sub-station is planned for the land adjacent to this site.

Regardless of whether this site is eventually deemed suitable for an Industrial Area or not, the fact remains that a suitable area must be set aside for a Light Industry Service Area to meet the requirements for the forecast growth in population for this region.

### **Additional Infrastructure Requirements**

The proposed developments will require additional infrastructure such as water, electricity and sewerage. All of the cost of these items are funded by developer contributions, and will not be a burden on existing rate payers.

Council have now completed the upgrade to the sewerage treatment works at Bonny Hills, and are in the process of supplying additional water mains from Port Macquarie to cater for the extra demand.

As mentioned, Country Energy has approved plans to move the existing sub-station from Ocean Drive adjacent to the new Medical Centre, to their new site in Houston Mitchell Drive. This new plant is designed to cater for the extra demand from the new housing estates. The existing plant will be dismantled, and the land may be set aside for future community use.

### **Summary**

In summary, the forecast population increases, brought about by the new planned housing estates, are likely to have some impact on the village lifestyle, as we know it. At this stage there is no other land within the region approved for re-zoning to residential use; however, there is land within the Lake Cathie area under consideration for future re-zoning. These areas include land situated off Houston Mitchell Drive, as well as land situated off Kenwood Drive.

Rather than detract from the village lifestyle, a population increase can benefit the community by providing more services and amenities. New additions to the village such as Woolworths supermarket and the Medical Centre are a direct result of population increase to the village in recent times. Such things as restaurants and coffee lounges etc, along with more specialty shops, will invariably occur as a result of the forecast increase in the population. Whilst this may not please everyone in the community, some will see this as an advantage rather than a drawback.

There will be extra people using the beaches and waterways, extra motor vehicle traffic, and extra people using the shopping precincts. To avoid losing the village atmosphere it will be paramount that strict planning requirements are enforced to adequately cater for our new neighbours.

## Management Recommendations and Priorities: Urban Development

Findings	Recommendations	Authority	Priority
The proposed new housing estates will have the potential to change the village atmosphere currently enjoyed by the Lake Cathie community.	<i>Using the information contained in this Plan, Council must ensure that all of the issues likely to have an adverse impact on Lake Cathie are addressed.</i>	PMHC	High

### D4. CULTURAL and COMMUNITY SERVICES

#### D4.1 Health

For the better part of Lake Cathie's history, medical services available within the village fluctuated from having a resident GP only, to having no services at all. This meant residents had to travel to Port Macquarie or Laurieton for medical attention. Efforts made by the LCPA in recent times to attract a permanent doctor to Lake Cathie have now proved successful, and medical needs are again being met locally with our new Medical Centre, recently expanded.

Dental Services are now also available from the new Medical Centre, again saving residents a trip to Port Macquarie or Laurieton. Despite concerns expressed to LCPA regarding Council's intention to introduce fluoride into the water supply, results from the poll registered 53% supporting this move, and just 26% against.

A pharmacy has operated successfully in the village for many years. Whilst this essential service caters well for the community, the recent poll revealed that extended services over the weekend would be appreciated, with 69% for, and only 6% against.

Prompt ambulance services appear to be of some concern judging on the response from the Survey, with 74% of those polled, in favour of the establishment of a local ambulance station to better serve residents from Bonny Hills and Lake Cathie. Hospital services are available in Port Macquarie. Community services (Meals on Wheels, Community Transport, etc.) can be arranged for the elderly through the Services Division of Port Macquarie-Hastings Council.

#### D4.2 School Education

At the present time there are no school facilities located between Port Macquarie and North Haven, despite the fact that the village now has a large number of pupils attending public schools in Port Macquarie, Laurieton and North Haven.

It should be noted that many of these students are forced to travel up to more than two hours per day in order to attend school.

The situation can only deteriorate, given that the both Lake Cathie and Bonny Hills are experiencing an increase in population of children aged between 0 and 15. According to the 2006 Commonwealth Census, Lake Cathie alone had 578 children aged between 0 and 15.

A site for a school has been reserved at the junction of Ocean Drive and Fiona Crescent, although the suitability of this would depend on detailed planning. There is a risk that the present site could be flood affected, it will adjoin the tavern, and could be more centrally located for Bonny Hills pupils. The Education Department also owns land at Bonny Hills.

The recent Survey revealed that 38% agreed that a primary school should be established on the reserved site, as opposed to 40% against using that site. When an alternative site at Bonny Hills was suggested, 47% preferred that option, as opposed to 18% against. It should be noted that 35% were neutral on this option.

### **D4.3 Fire Management**

There is a well supported and well equipped voluntary Rural Fire Service Brigade operating in the village. Its new headquarters and equipment shed are located in Ernest Street, and the Brigade deals with both rural and urban emergencies.

The Brigade was formed in the early 1950s, and is now equipped with a Category 1 Tanker for Village Protection/Structural Fire Fighting, and a Category 9 Strike Unit.

An evacuation plan in case of a major fire event should be considered.

### **D4.4 The Community Hall**

The Hall, which is located in Mullaway Road, was erected in the mid-1980s following several years of lobbying and fund raising by LCPA. It consists of a large community meeting room, a smaller committee room, kitchen, toilets and storeroom. Council contributed to the funding, and the Hall is now managed by a committee appointed by Council under Section 355 of the Local Government Act. The committee is fairly autonomous and is largely responsible for its own collection and disbursement of funds. Its principal objective is to "ensure that the Centre is able to be used as a place of entertainment, relaxation, recreation, and for private functions of the community of Lake Cathie".

Usage rate of the Hall is moderate, with emphasis on activities by special interest groups (eg. Tai-kwon-do, dancing classes), occasional meetings (LCPA Inc., Estuary Management Committee, etc.), and weekend group gatherings (birthday celebrations, engagement parties etc.). Such problems which do occur are usually associated with overuse of alcohol and excessive noise during some private functions. Stricter management and installation of sound proofing would overcome these problems, and some internal changes (eg. to the committee room for establishment of a library and to encourage greater use by seniors' and youth groups) might improve the usage rate.

A regular play group (Kathie Kids) also utilises this area as do local parents and children from the new adjacent housing estate, taking advantage of the play equipment.

As with most of the children's play areas, criticism was received from our Survey regarding the lack of toilet facilities and drinking water to these playgrounds. In canvassing ideas to fully utilise this community asset, the recent Survey put up several suggestions for some input. The following responses were recorded:

Strong support for a Library service with 60% for, and 10% against.

The reintroduction of Adult Education Courses was supported, with 47% for, and 13% against.

The availability of more unspecified organised activities was strongly supported, with 60% for, and only 3% against.

The question of how best to use the vacant land adjacent to the Hall received a mixed response, with strong support for the development of this area to provide leisure activities for older and less physically-active residents, with 63% for, and 11% against.

A clear indication was also received from the poll that the development of any proposed sporting amenities not be considered for that area, rather that such facilities as cricket nets and netball courts be confined to the sports fields.

#### **D4.5 The Library and Adult Education**

Council currently provides very good library services through its libraries at Port Macquarie, Laurieton and Wauchope, where there are a wide range of reference and popular printed material, and good standard research opportunities and facilities.

Because of the high proportion of retired residents in Lake Cathie, many of whom depend on these services but often find difficulty in accessing them, discussions were held with the Port Macquarie Librarian, Ms R. Hardman, on alternatives. Provision of a permanent library in the village rather than a mobile service is favoured. The Library has sufficient book stocks and technical services to initiate the establishment of a branch in Lake Cathie; pre-requisites would be availability of a suitable site, provision of staff, and Council approval. The site should present no problem - the Community Hall, perhaps with some alteration without upsetting its present uses, would seem to be ideal. Council approval should be forthcoming if the proposal can be shown to be practicable and economical, so the provision of staff would seem to be the key. Ms Hardman advised that permanent staff attract grants, and thus would be preferable to volunteer or part-time staff.

Discussions have been held with representatives of Port Macquarie Adult Education regarding the feasibility of providing face-to-face training in Lake Cathie to facilitate attendance by older residents. The response was favourable provided the courses would not require special equipment. It would be up to residents to get together and seek appropriate courses from either of these institutions. The Lake Cathie Community Hall would be an appropriate venue for any studies arranged.



## D4.6 Miscellaneous

**Law Enforcement** in the village is the responsibility of the Port Macquarie Police staff, with back-up from the Laurieton station. The O.I.C. of the Port Macquarie District advised that there are no plans to open a station or to locate staff in Lake Cathie, although naturally the situation would continue to be monitored as the village grows, and/or facilities or activities which might be likely to increase local concerns are developed. The Survey results indicate that most residents feel that police should at least carry out more regular patrols, especially over the weekends, with 7 % in favour, and only 3% opposed. A further 72% are in favour of the establishment of a Police Station, in some form, to service the Lake Cathie- Bonny Hills area.

**Waste Disposal.** Council contractors carry out a weekly collection of waste for disposal. A separate bin is provided for recyclable materials, with the remainder disposed of in land fill sites. The opening of a new Waste Transfer Depot adjoining Cowarra State Forest is planned. Although arguments have been raised against this proposal (36% against, and 22% for) the benefits of having such a facility, such as reducing illegal dumping of garbage in our forests and bushland, need to be better explained. Its location and site are well outside the boundary and objectives of this Plan. Insofar as Lake Cathie is concerned, the present waste disposal system appears to be operating quite satisfactorily. Although the majority of residents surveyed wanted a weekly disposal service for their yellow bins (44% for, and 33% against), the extra cost of this service has not been investigated, and may result in a re-think by supporters for. However an additional weekly service over the Christmas period at least, should be considered.

### Management Recommendations and Priorities: Community Services

Findings	Recommendations	Authority	Priority
Many residents are concerned about their safety & security.	<i>Better policing should be pursued with planning now for a future Police Station to be established in the region.</i>	NSW Gov PMHC	High
A Library service of some description is required for the village.	<i>Efforts to have a branch of Port Macquarie Library established in Lake Cathie should be pursued. Subject to more detailed consideration of alternative sites, the Community Hall would provide a suitable venue.</i>	PMHC	Medium
A Primary School for the Lake Cathie / Bonny Hills area is required.	<i>The Future School Committee efforts to have a Primary School established should be given every support by Lake Cathie organisations as well as Council to achieve this goal.</i>	PMHC NSW Gov	High

<p><b>More organised activities should be available at the Community Hall.</b></p>	<p><i>The Hall Committee should be given every support by the residents of the village (including a readiness to volunteer for membership when necessary) to promote suitable activities as outlined in the Plan.</i></p>	<p><b>PMHC</b></p>	<p><b>Medium</b></p>
--	---	--------------------	----------------------

**D5. SPORT and LEISURE**

Lake Cathie has grown into a substantial village during an era when urban planning, social needs, and environmental protection have become much more carefully integrated and controlled by local government. Despite this, and the earlier commendable efforts of residents involved in sporting organisations such as the Lake Cathie Sports Council and the Lake Cathie Tennis and Bowling Clubs, there is a dearth of the facilities required to meet the sporting and leisure needs of the residents in a village of its size. It is appreciated that some residents seeking relaxation can use the numerous foreshore facilities which have been installed for community and tourist use, but this begs the question as to the adequacy of opportunities available to a wide range of ages, and of sporting and leisure choices for families living in the village.

With the ongoing development of Jonathan Dickson Reserve, LCPA has sought funding for some exercise equipment to be installed at this venue. It is anticipated that this type of health and fitness equipment will prove to be popular for not only the younger people now residing in the village, but also for the older generation wanting to improve their fitness. This Reserve is proving most popular for residents and tourists alike as an area to exercise in, and the exercise equipment should prove to be an added attraction.

Despite the fact that the sporting and leisure needs of the residents are now far more diverse than they were 20 years ago, LCPA recognises the need to provide more facilities designed, and areas managed, to meet new or special needs. The Tennis and Bowling Clubs not surprisingly cater only for their specific sports.

The sports field, which provides principally for football, can no longer cater for the increased population, and organisers are now forced to start turning away intending young footballers. There are no venues available in Lake Cathie for other football codes such as AFL, or for the popular outdoor sports of cricket (neither oval nor practice nets), netball/basketball, or baseball. There are no facilities for non-team activities such as skateboarding; and no provision has been made for any of the indoor sports or activities - netball, gymnastics, indoor cricket or bowls. The end result is that sporting and leisure facilities are, with the exception of those provided for a limited range of residents by the existing clubs, totally inadequate, particularly for the younger age groups amongst whom the need is now and will increasingly become greatest.

The problems caused by Lake Cathie’s dearth of sporting and leisure opportunities are exacerbated by the distance its residents, particularly young people requiring parental transport, have to travel to find alternative venues.

Very poor planning from previous councils is the sole reason Lake Cathie can no longer accommodate every young person wishing to play sport within their own village. Despite their own population predictions, Council erred when it handed over an area of land to the NPWS that was set aside for the extension of the existing sporting fields. Efforts by the Lake Cathie Sports Council and LCPA to have Port Macquarie-Hastings Council to at least offer support to have the NPWS hand back enough land to provide for this much needed facility, to date has been fruitless.

Unless suitable land can be purchased for public facilities in Area 14 south to Bonny Hills (and it has been suggested that the one potential site of any size is likely to be subject to acid-sulphate soil problems), or provided by commercial operators (doubtful because of the small population), it appears unlikely that many of these existing needs will be readily met. Any further development in the Lake Cathie/Bonny Hills area before this problem is adequately addressed would seriously exacerbate the position. The community has registered very strong support for the extension of the sporting fields, and is calling on Council to support this vital requirement, with 79% for, and only 5% against.

### **D5.1 Iron Man Events**

Though not strictly a sport likely to involve many residents of Lake Cathie, these events impact on the residents by virtually isolating the village whenever they are run. The Half Iron Man event is generally run in late October each year, with Ocean Drive closed to traffic between Middle Rock Road and Port Macquarie. The Iron Man Australia event that attracts up to 1500 competitors and is held each year in early May, also results in the closure of Ocean Drive, with no access available along Ocean Drive to Port Macquarie or to the Pacific Highway via Houston Mitchell Drive. Motorists wanting to access both areas can do so via Laurieton.

General comments from the Survey respondents supporting this event argued that it benefited the entire region with added tourists visiting our area as a result of this event. They also point to donations received from the organisers of these events which have benefited both the local Bowling Club, whose members act as volunteers, and the Sports Council. On the other hand respondents who opposed this event were often outraged in their comments, arguing that it was unfair to residents and local businesses alike, particularly from the inconvenience of being denied free access to and through the village on those days. The Survey asked respondents to indicate whether they supported the Iron Man Events. 45% said they do, 40% were opposed to it, and 15% were neutral.

It is interesting to note that whilst there was a majority of respondents in favour of these events, generally, it was a different outcome when the question of support for closing off Ocean Drive in order to run these events was posed, with 55% opposed, and 35% for.

The question of compensation for the residents for any inconvenience, and for local businesses for the loss of trade, was supported, with 49% supporting compensation for local businesses, and 32% against. 44% supported compensation in some form to the community, with 32% opposed.

## Management Recommendations and Priorities: Sport & Leisure

Findings	Recommendations	Authority	Priority
<b>The existing sporting fields is inadequate to cater for the increased demand.</b>	<i>The expansion of the existing sporting fields is vital to ensure that everybody now and in the future is not denied this basic right to be able to participate in organised sport. All the community are encouraged to support the Sports Council in their endeavour to provide sporting facilities for the benefit of the youth and the sporting fraternity amongst our community. The extension of the sports fields should have areas set aside for netball courts, skate park, and cricket oval and include practice cricket nets and designated athletic facilities.</i>	PMHC NPWS	<b>High</b>
<b>The majority of Lake Cathie residents are opposed to having the village isolated during the running of the Iron Man events.</b>	<i>The LCPA should meet with Council and the Iron Man Event organisers to address the community's concerns with this event.</i>	PMHC	<b>Medium</b>

### D5.2 Playgrounds

Consideration of play and relaxation facilities must include pre-school age groups, particularly as the 2006 census figures showed that the young population in Lake Cathie is relatively high.

In recent years Council has provided new playground equipment to the Endeavour Park Reserve, and upgraded the existing playground equipment to the Foreshore Reserve. There is scope to provide playground equipment to Jonathan Dickson Reserve and to the Sporting Fields at least.

- Comments concerning playgrounds from the Survey pointed to the absence of shade to the playgrounds, with 63% wanting shade protection. Ideally this protection could be provided by appropriate shade trees over time, but shade cloth covers in the short term would appear to be appropriate. In all cases the need for adequate shading of these areas cannot be stressed too strongly. Community concern over ultra-violet threats to health are discussed in Section 6 of the Plan, but consideration of amenity plantings for this purpose should always be a planning component, particularly as they can also be selected to complement wildlife habitat, and enhance the scenic amenity of the village.

- \* Other comments regarding the need to have fresh drinking water and toilet amenities available have merit, and should possibly be a condition in future planning of these types of facilities.
- \* The absence of litter bins at these playgrounds was also noted.

### Management Recommendations and Priorities: Playgrounds

Findings	Recommendations	Authority	Priority
<b>The village requires more dedicated children’s playgrounds.</b>	<i>A dedicated playground with a range of quality equipment to cater for a wide age range of younger children should be established (as planned, in conjunction with other developments) at the Jonathan Dickson Reserve and the existing sporting fields.</i>	PMHC	Medium
<b>The existing playgrounds require better facilities and shade protection.</b>	<i>The need for protection from UV threats should be a standard feature in planning the establishment of children’s playgrounds. Other facilities such as fresh drinking water, litter bins and toilet facilities need to be provided to some existing and all future play grounds.</i>	PMHC	Medium

## D6. TOURISM

The recent Village Survey posed several questions in an effort to gauge the present day residents’ attitude towards tourism and how it affects their lifestyle. It must be kept in mind that in previous years tourism attracted many visitors to the village, with many returning as residents. In the 2000 Master Plan it was resolved that tourism must add to the quality of life for residents as well as visitors, not detract from it. We firstly asked whether residents would like to see tourism increased. 39% felt it should be, 16% disagreed and 35% were neutral. A further 44% were happy to have increased tourism of a limited nature, whilst 20% disagreed, with a further 36% voting neutral.

It is difficult to reach an accurate conclusion from the above information about the residents’ attitude, but it appears that the majority of the proponents are happy with the status quo. This is emphasised with the response from further questions posed. When asked if Lake Cathie requires more motels, only 23% agreed, and 42% disagreed. In relation to whether a Conference Centre was needed, only 10% agreed with that suggestion, with 58% disagreeing. The suggestion of a backpacker hostel met with a resounding 75% against, and only 8% for.

Other alternative proposals were centred more on potential day trippers, or proposals that would probably benefit the quality of residents. Attractions such as ecotourism, bushwalking and bird watching, which are currently available, albeit that some work to better promote them is required, were well supported, with 60% in favour and only 8% opposed to this form of tourism.

Recent tourist attractions such as a canoe hire business and a floating castle have proved to be very popular with local holiday makers and day-trippers attracted to the lake.

There is no doubt that Lake Cathie has always attracted tourists wanting to fish our estuary and beaches. Many are repeat visitors, and some come almost every year.

With this in mind the question was posed should *Lake Cathie better cater for recreational fishing?* 60% agreed that it should, with only 12% disagreeing.

### **Management Recommendations and Priorities: Tourism**

<b>Findings</b>	<b>Recommendations</b>	<b>Authority</b>	<b>Priority</b>
<b>Increased tourism to the village is generally supported providing it does not threaten the present life-style of the residents.</b>	<i>Proposals such as new holiday apartments, providing they include ample off street parking, etc., is generally accepted by the community.</i>	<b>PMHC</b>	<b>Ongoing</b>
<b>Proposals which will enhance tourist opportunities should focus on the natural values of the area.</b>	<i>The construction of walking trails, including the proposed Googik Track, specifically following our waterways where access is limited, thereby providing bird watching and bushwalking opportunities.</i>	<b>PMHC</b>	<b>High</b>
<b>The waterways and the lagoon in particular are major tourist attractions.</b>	<i>Every effort should be made to ensure that waterways are correctly managed, maintained and enhanced.</i>	<b>PMHC</b>	<b>High</b>

## **D7. PRECINCT PLANS**

A number of popular sites will require detailed planning to ensure that recreational needs and environmental management are properly balanced. These have been given the name of 'precincts' to encourage the consideration of not only the site itself, but also the ancillary requirements of access, servicing, maintenance, etc., to ensure that sustained management objectives are achieved. The recreation precincts in the Lake Cathie area offer a wide range of different opportunities for residents and visitors alike. It is vital that good environmentally sustainable management principles are adhered to.

### D7.1 Perch Hole Reserve

This precinct is the responsibility of the NPWS, and reference has been made to it in the Lake Innes Nature Reserve Plan of Management. At present it is mainly used by recreational and commercial fishermen (the latter for access to Lake Innes), but this situation will change if the lake is closed off from Cathie Creek, as recommended in the Plan.

Plans to repair past damage and to provide facilities are supported, but the site will always be subject to overuse and environmental damage, and care should be taken in planning to minimise this risk. Until a final decision is taken on Lake Innes it will be difficult to make long-term plans for the area, and interim action should desirably be limited to restoration and the provision of basic facilities only.

#### Management Recommendations and Priorities: Perch Hole Reserve

Findings	Recommendations	Authority	Priority
Although not heavily used, this Reserve requires a serviced garbage receptacle.	The absence of any type of bin supplied on site often results in rubbish entering the lake from this reserve. Volunteer community members routinely remove rubbish from this area.	NPWS	High

### D7.2 The Chepana Coastal Reserve.

This Reserve is managed by Port Macquarie-Hastings Council as trustee for NSW Department of Lands. In 2008 Council commenced an ongoing program to rehabilitate this area and restore as much as possible the badly degraded littoral rainforest. To this end Council has employed professional bush regenerators, and utilized Green Corps labor. Assistance is also being given by Lake Cathie Landcare and individual residents. Plans include closing off unauthorized access tracks to the beach, and providing formal access at intervals. There has been strong past community support for the construction of a low-key gravel walkway through the rainforest as part of the proposed Googik Track, and a track in this location was one of the preferred outcomes nominated in the Lake Cathie section of the Urban Design Master Plan adopted by Council in 2004. However, in view of the current financial situation, this project will require considerable community input, and sourcing of funds for an environmental impact study and the actual track construction.

The feral deer population that exists in this Reserve is causing a major problem for bush regeneration. Feral deer trample and graze on native plants and spread weeds. These actions are setting back efforts by bush regenerators to restore this rain forest. Action to eliminate this pest from the Reserve is long overdue.

### Management Recommendations and Priorities: Chepana Coastal Reserve

<b>Findings</b>	<b>Recommendations</b>	<b>Authority</b>	<b>Priority</b>
The community should be vigilant to ensure that the work to restore the rainforest and protect the dunes is ongoing, and that areas completed are maintained.	<i>Construction of the walking track through the forest is strongly supported by the community. Plans to complete this section of the Googik Track require a community champion such as Lake Cathie Progress Association or Lake Cathie Landcare to progress the project.</i>	PMHC	High
Feral deer need to be better managed or eliminated from this reserve.	<i>Herbivory and environmental degradation caused by feral deer is recognised by DECC as a key threatening process to littoral rain forests. A feral deer management plan for this reserve should be prepared.</i>	PMHC	High

### D7.3 Cowarra Creek Reserve

This precinct is located at the junction of Cathie Creek and Cowarra Creek, and is the responsibility of the NPWS (which manages the immediate foreshore of Cathie Creek). It can be accessed directly by boat, or by vehicle (even 2WD during dry periods) via what is incorrectly signposted as a 'walking track' from Lakeside Way in the Lakeside Woods development. This uncontrolled access has resulted in the site becoming something of an environmental slum, with eroded tracks and indiscriminate rubbish littering, whereas it has the potential to be developed into an attractive day-use site for walkers and boaties.

Closure of the track and conversion to a walk-in area is the first priority, followed by planning to develop over time a low-key picnic area with simple park furniture.

Priority for this precinct is not high (except for access rationalisation to prevent further deterioration), unless local residents wish to contribute time to the project.

### Management Recommendations and Priorities: Cowarra Creek Reserve

<b>Findings</b>	<b>Recommendations</b>	<b>Authority</b>	<b>Priority</b>
Although not heavily used, this Reserve requires a serviced garbage receptacle.	<i>The absence of any type of bin supplied on site often results in rubbish entering the lake from this Reserve. Volunteer community members routinely remove rubbish from this area.</i>	NPWS	Medium



#### D7.4 Jabiru Reserve

This popular precinct is in good condition and with recent upgrading of the access points provides an excellent area for boat launching. LCPA with the help of the local fishing club and a government grant also improved this site by providing a fish cleaning table.

Although this reserve was not developed to serve as a duplicate of the Foreshore Reserve, overflowing of the Foreshore Reserve has resulted in the use of this reserve as an alternative site for recreation.

As a result of the increased popularity of this Reserve some rationalisation of the existing road and pedestrian crossing to the adjacent shops will become necessary, as use increases, and the provision of toilets might also become unavoidable in the longer term. Several questions were posed in the Survey regarding future development to this reserve, with 59% agreeing that a toilet block needs to be constructed, as opposed to 12% disagreeing. The establishment of more barbeques and shelter sheds was also supported, with 50% in favour and 12% against.

#### Management Recommendations and Priorities: Jabiru Reserve

Findings	Recommendations	Authority	Priority
The forecast population increase of the LGA will cause overcrowding to this Reserve.	<i>Future planning for the expansion of this area is required.</i>	PMHC	Medium

#### D7.5 Foreshore Reserve

Already highly popular and well maintained, this Reserve has seen recent improvements by Council that should be acknowledged. Improvements include the renovation and the addition of a disabled toilet to the amenities block, a concrete pathway connecting the barbeque areas to the toilets, upgraded playground equipment and a new shelter shed, along with several new barbeques. Council has also upgraded and formalised access points and parking areas. An extension of the walking trails leading from this reserve to link up with existing tracks are planned by the local Landcare Group with the completion of these works scheduled before Christmas, again adding to the attractions of this Reserve.

On the negative side, very dangerous conditions presently exist for pedestrians wanting to cross the busy Ocean Drive in order to access the shops. A pedestrian crossing, together with a median strip and a refuge island, is required. Extra car parking areas and better lighting to this Reserve are also requested by visitors and the community.

#### Management Recommendations and Priorities: Foreshore Reserve

Findings	Recommendations	Authority	Priority
Planning for extra facilities to this Reserve is required.	<i>The Council should plan and budget for extra car parking areas, more barbeques and lights for this Reserve.</i>	PMHC	Medium

## D7.6 Kenwood/Tallong Drive Reserve

This Reserve should be recognised as the portion of land fronting the lake extending from Ocean Drive along Tallong Drive to the intersection of Kenwood Drive. The present condition of the site could be best described as rudimentary, and could be improved by providing a shared walkway leading from the bridge, bush regeneration and general landscaping, using low-growing native plants, such as rushes, sedges, etc. The addition of a bubbler and litter bins would also complement this area.

Many walkers currently use this area and are forced to walk on the roadway, due to the absence of any footpaths. Improvements involving a path, some landscaping, and the addition of a few seats would make this area very attractive.

It should be noted that this intersection at Kenwood Drive, along with many other intersections within the village, is inadequate to handle existing traffic safely, and some encroachment into this reserve may be necessary in future road upgrading. It is therefore recommended that minimal development take place on this area of the reserve at this stage, apart from the aforementioned improvements.

### Management Recommendations and Priorities: Kenwood/Tallong Drive Reserve

Findings	Recommendations	Authority	Priority
<b>This area would benefit from some development.</b>	<i>The above suggestions from the Plan should be encouraged and adopted.</i>	<b>PMHC</b>	<b>Medium</b>

## D7.7 Tallong Drive Bushland Reserve

For the purpose of this review, this Reserve should be identified as that strip of bushland extending from Kenwood Drive to the Glenugie Street intersection. This Reserve contains valuable vegetation including large koala food trees, and provides an excellent wildlife corridor for our many native species. Despite bush regeneration works in the past, the general condition of the bush is poor and is in need of weed eradication.

Tallong Drive itself currently represents a major safety hazard for pedestrians and cyclists, and as mentioned in Section 2, despite Council's attempts to calm the traffic in this area, this road remains a very dangerous thoroughfare.

Suggested improvements to this area would be the establishment of a shared bicycle/walkway that would encroach into the bushland, to initially provide for safe access for walkers and cyclists. A suggested future walking trail closer to the lake (as mentioned in the Tourism Section of this Plan) could link up to this proposed track over time. No further development is recommended for this Reserve at this time.

### Management Recommendations and Priorities: Tallong Drive Reserve

Findings	Recommendations	Authority	Priority
A shared walking track and bush regeneration are required for this area.	<i>The above suggestions from the Plan should be encouraged and adopted.</i>	PMHC	High

### D7.8 Aqua Reserve

Council has in recent times provided valuable improvements to this popular Reserve. Some of the improvements involved extending the pathway from Ocean Drive to link with the existing path, and providing disabled parking and a pathway suitable for wheel chairs to link up also to the existing path. Several new barbeque areas were also included in these improvements. Again LCPA erected a fish-cleaning table that is proving to be a very popular addition to this area.

Unfortunately, due to road design constraints, the problem of providing any further formal parking areas has limited any further expansion to this reserve at the present time.

### Management Recommendations and Priorities: Aqua Reserve

Findings	Recommendations	Authority	Priority
Aqua Crescent is a traffic hazard in the tourist season.	<i>This matter should be referred for inclusion in the new Lake Cathie Traffic Management Plan.</i>	PMHC	High

### D7.9 Bundella Avenue

The 1984 Creighton Report recommended that action be taken to protect the southern headland of the estuary from storm damage. This was never done, although on infrequent occasions (during the 1970s and again in 1999) the potential for severe erosion has been apparent.

The extension of the rock wall and concrete pathway from Aqua Reserve below Bundella Avenue to the beach would achieve the dual objectives of protecting the headland (and hence Bundella Avenue), and providing safe pedestrian access away from busy traffic all the way to the beach from Ocean Drive.

Attention is also directed to the earlier discussion (Section 1.3 - Other Access) about the likely construction of the Googik Track, which if it proceeds would ultimately link Port Macquarie - Lake Cathie - Bonny Hills - Laurieton, and would certainly increase the tourist use of a path such as this. This section would form an important component of a Lake Cathie to Middle Rock Track, even if the Googik Track takes time to eventuate.

From casual observation it also appears likely that it would be possible to construct a service/emergency track off Bundella Avenue behind the rock wall, to provide for berm opening plant or emergency services to access the beach, as well as more formal parking complemented by appropriate landscaping. Such a development might also permit the establishment of a more aesthetic and permanent site for an appropriate surf lifeguard shelter. The whole proposal (rock wall, concrete path, service track, shelter) would require a feasibility study, but the location of

the coffee rock which was exposed during storms early in 1999 suggests that the footings below Bundella Avenue should be adequate for such construction.

When questions relating to this area were put in the Survey 79% of the respondents agreed that the existing training wall should be extended to the beach, and that feasibility studies to determine the potential of improved usage of this area be included in the ongoing Coastal Management Study.

A further 76% of the respondents agreed that amenities such as a lifeguard shelter, canteen, toilets and change areas be included in future planning for this Precinct.

#### **Management Recommendations and Priorities: Bundella Reserve**

<b>Findings</b>	<b>Recommendations</b>	<b>Authority</b>	<b>Priority</b>
<b>More formal parking areas and a formal pedestrian walkway are required.</b>	<i>This matter should be referred for inclusion in the new Lake Cathie Traffic Management Plan.</i>	<b>PMHC</b>	<b>High</b>
<b>The existing train wall should be extended to the beach.</b>	<i>This subject should be examined as part of the current SMEC report.</i>	<b>PMHC</b>	<b>Medium</b>

#### **D7.10 Jonathan Dickson Reserve**

This site once served as a council caravan park and now provides a valuable community asset. Council provided a shared bicycle/walkway that meanders through the park, and together with the Landcare Group regenerated the highly degraded bushland.

Although still under development, this park is proving to be very popular with residents of all ages and with visitors. The area of the reserve on the corner of Illaroo Road & Kywong Street features a popular barbeque and a shelter shed, and as mentioned previously, LCPA plans to provide exercise equipment to this section of the park. This Reserve also has a toilet block in place and would be an ideal area for a children's playground.

#### **Management Recommendations and Priorities: Jonathan Dickson Reserve**

<b>Findings</b>	<b>Recommendations</b>	<b>Authority</b>	<b>Priority</b>
<b>Further development to this Reserve is required.</b>	<i>Planning for more amenities such as exercise equipment, playground, more barbeques and shelter sheds, and extra car parking areas is essential.</i>	<b>PMHC</b>	<b>Medium</b>

#### **D7.11 Middle Rock Reserve**

Despite the fact that it should be one of the major attractions along this stretch of coastline, this has long been a neglected and under-used precinct. Although the area is popular with board riders and some 4WD owners, the poor signposting and gravel road access have acted as a

deterrent to use. Although recent Council works in this area have resulted in a better laid out and more pleasant recreation area, it still remains relatively unused.

This precinct also features a littoral rainforest, and although protected under SEPP 26, has been until recent times neglected and let fall into a degraded state. Contrary to principles adopted by NPWS and other management bodies charged with the responsibilities of managing these forests, Port Macquarie-Hastings Council seems intent on locking up the area, thereby unwittingly encouraging a myriad of informal tracks, as opposed to creating formal pathways together with proper signage, in order to eliminate the damage caused by indiscriminate use of this fragile asset.

Several questions were posed in the Survey to determine the attitude towards further development of this precinct, with 62% of respondents agreeing that the road should be sealed, and 18% disagreeing.

64% agreed toilet facilities should be available, as opposed to 19% against.

A further 48% of respondents agreed that a shelter shed and barbeques should be provided, whilst 20% disagreed with this type of development.

The combination of poor access, under-use, and limited development make this a site where the application of sound planning principles and priorities should be straightforward, although results from the poll indicate that there is some resistance to further development.

Except for emergency access, which can readily be provided through a locked barrier, the retention of 4WD access to the beach via Middle Rock cannot be justified. It is often misused near Middle Rock, and social conflicts will increase as the whole beach becomes increasingly popular with beach users.

The Survey supports the exclusion of 4WD vehicles from this area, with 50% agreeing with the exclusion, and only 18% disagreeing.

### **Management Recommendations and Priorities: Middle Rock Reserve**

<b>Findings</b>	<b>Recommendations</b>	<b>Authority</b>	<b>Priority</b>
<b>Erection of a locked barrier to control beach access is required.</b>	<i>The use of this beach by 4WD vehicles is not supported and can't be justified.</i>	<b>PMHC</b>	<b>High</b>
<b>Provision of picnic facilities, including water supply, and pathways is required.</b>	<i>The further development of this Reserve is required to cater for the predicted population growth of the region.</i>	<b>PMHC</b>	<b>Medium</b>
<b>Construction of toilets and the erection of an open style wet-weather shed are required.</b>	<i>Planning for basic amenities for this Reserve will need to be prioritised as the Reserve becomes more popular.</i>	<b>PMHC</b>	<b>Medium</b>

<b>Upgrading and sealing the access road from Ocean Drive/Chepana Street is required.</b>	<i>Sealing of this road will eliminate the environmental damage to the littoral rainforest.</i>	<b>PMHC</b>	<b>High</b>
<b>Formal gravel pathways and signage through the littoral rainforest.</b>	<i>The preparation of a plan to prevent indiscriminate use of the littoral rainforest by bushwalkers and beach users is required to further protect this forest.</i>	<b>PMHC</b>	<b>High</b>
<b>Feral deer need to be better managed or eliminated from this Reserve.</b>	<i>Herbivory and environmental degradation caused by feral deer is recognised by DECCas a key threatening process to littoral rain forests. A feral deer management plan for this Reserve should be prepared.</i>	<b>PMHC</b>	<b>High</b>

#### **D7.12 Endeavour Park Precinct**

This Precinct is a relatively new addition to the village precincts, and was provided mainly to cater for the residents of the new housing estate within that locality. The area provided is quite large with the potential for future development, if required. It should be noted that although the demographics of this area suggest younger families are more prevalent in this location, the estate also includes a mix of older residents without children. With this in mind we posed several questions in the Survey regarding possible future development of this Park. 44% of the respondents agreed that they would like to have picnic facilities provided, with 22% voting against this proposal. A proposal to establish a skate board facility was moderately supported, with 40% in favour, however 32% were against this proposal.

The provision of a netball/basket ball court was better supported, with 41% in favour, and 26% opposed.

Any recommendations to further develop this Park would require a management committee made up of interested residents to consult properly with the Estate's residents to determine the best usage of this precinct.

#### **Management Recommendations and Priorities: Endeavour Park Reserve**

<b>Findings</b>	<b>Recommendations</b>	<b>Authority</b>	<b>Priority</b>
<b>Some further development of this Reserve is supported.</b>	<i>A management committee consisting of residents from this estate should be formed to make recommendations to Council regarding future management options for this Reserve.</i>	<b>PMHC</b>	<b>Medium</b>

## **E. PLAN IMPLEMENTATION**

### **E1. Management Recommendations and Priorities**

It is accepted that the implementation of the recommendations contained in this Plan will depend on the availability of funds, some of which will be outside the control of Port Macquarie-Hastings Council. Notwithstanding this, an attempt has been made to give Council and other relevant authorities a clear picture of community opinion on the priority of the works discussed herein.

These priorities should be reviewed annually (when Port Macquarie-Hastings Council is preparing its next year's Works Programme) by LCPA, in the light of progress made, funding availability or other changed circumstances. The whole Plan will be reviewed by LCPA at five yearly intervals. In this way it is hoped that the Council and the Lake Cathie community will work together to achieve the objectives of the Plan, and a progressive improvement in the natural and social environment of the village.

### **E2. Review of the Master Plan**

This Plan will, unless amended to determine otherwise, operate from December 2010 until December 2015, when it will be reviewed under the direction of the LCPA Inc. The process of review will be a matter for the Executive Committee of the day, but unless the circumstances change, a similar process to that followed to prepare this Plan is proposed.

Thereafter, the Plan should be reviewed at 5 yearly intervals.

Amendments to the Plan during the course of each specified Plan period may only be carried out after they have been (i) endorsed by, following a notice of motion to, a regular meeting of the LCPA Inc.; (ii) placed on public exhibition and representations received and reviewed; (iii) confirmed by LCPA Inc. at a General or Special Meeting.

## F. GLOSSARY

AHD	(Australian Height Datum) Base line for all elevation above sea level readings throughout Australia
Area 14	Planning unit within Port Macquarie-Hastings LGA south of Lake Cathie
Beach Patrol	Volunteer patrol directed by the Surf Life Saving Association
Berm Opening	Mechanical opening of the sandbar closing the estuary
Bikeway	Track designed and constructed for use by cyclists only
<i>Birpai</i> (also <i>Biripi</i> )	Name of Aboriginal tribe that originally owned the Hastings Valley and adjoining areas, and their descendants
Blowout	Wind erosion of dunes activated by human action
<i>Cati</i>	An earlier (1840s) spelling of Cathie
Dunecare	Repair and restoration work carried out by a group of volunteers authorised by NSW legislation
EIS	Environmental Impact Study undertaken prior to any major development capable of having a serious impact on the natural or social environment
4WD	Four wheel drive vehicle
<i>Googik</i>	Aboriginal word meaning “nose”
GPT	(Gross Pollution Trap) A device to prevent entry of pollutants into a waterway
Heritage Centre	A centre for the display and teaching of Aboriginal culture
ICOL	Abbreviation of ‘Intermittently Closing and Opening Lagoon’
<i>Koori</i>	Aboriginal for ‘man’ or ‘people’, now frequently used and accepted to identify individuals or groups of Aborigines
LALC	Local Aboriginal Land Council, a statutory body representing an Aboriginal tribe
LCPA Inc.	Lake Cathie Progress Association Inc
Levee	Construction to hold back river or flood water
NPWS	National Parks and Wildlife Service of NSW
Pleistocene	Geological Age preceding the present (Holocene) period
Precinct Plan	Plan for the management of a discrete unit or area
Prism (tidal)	The volume of water exchanged with each tide change
RTA	Roads & Traffic Authority of NSW
Reverse delta	Sediment deposited at the entry to Lake Innes
Sedimentary	Rocks formed from material deposited in water
Tidy Towns Committee	A voluntary committee formed to promote interest and effort towards the annual State Tidy Towns competition
UV	Ultra violet rays causing skin cancers
UNE	University of New England



## **G. BIBLIOGRAPHY**

- Armstrong, G. *Wingham Forest Management Area EIS 1991; Lake Cathie Village Master Plan; Lake Innes.*
- Pountey, R. K. *Hastings Shire Gazette.*
- Creighton, C. *The Lake Innes-Lake Cathie Catchment; 1983. UNE thesis.*
- Hastings Council. *Draft Plan of Management - Neighbourhood Parks 1998.*
- Hastings Council. *2006 Census Population and Dwellings Summary Results.*
- Hastings Council. *Local Environmental Plan 1987.*
- Hastings Council. *Community Plan (1996-2001).*
- Lake Cathie Tidy Towns Committee. *Lake Cathie Koala Survey 1887-1999.*
- National Parks and Wildlife Service. *Lake Innes Nature Reserve Draft Plan of Management 1998.*
- Public Works Department. *Lake Cathie Flood Study 1984.*
- Webb, McKeown and Associates (for Hastings Council). *Lake Cathie/Lake Innes Estuary Management Plan 1994.*
- Webb, McKeown and Associates (For Hastings Council). *Lake Cathie/Lake Innes Waterway Users Study 1998.*
- Environment Australia. *Impact of environmental weeds on biodiversity.*
- Hemer, M.A., J.A. Church and J.R. Hunter (2007). *Waves and climate change on the Australian coast. Journal of Coastal Research. SI, 50, 432-437.*
- CSIRO. *Sustainable Ecosystems, Marine & Atmospheric Research.*
- NSW Land & Water Conservation Dept. *Dune Slope Instability.*
- S.M.E.C. *The Lake Cathie Coastal Management Plan.*
- D.E.C.C. *Feral deer management.*

## **H. ACKNOWLEDGMENTS**

This 2010 Master Plan Revision has relied on much of the existing content and formatting of the excellent 2000 Lake Cathie Master Plan. Special acknowledgement must be given to the original co-ordinator and author, Geoff Armstrong.

Further acknowledgement is also given to the original committee who assisted in the 2000 document. They are Denis Carter, Bernadette Clark (Access); Geoff Armstrong (Waterways); Jim Roberts (Dune/Beach); Irene Johnson (Natural Environment); Bill Watson (Tourism); Clive Bax (Sport and Leisure); Ted Hutchison (Built Environment); John McCarthy (Community Services); Rob Tate (Urban Development); and Leslie Williams (School Education).

Special acknowledgements to the committee involved in producing this 2010 Master Plan Revision go to Jack Jones, Bob Jolly, Priscilla Flemming, Shirley Drewett, Kevin Tye, Richard Pierce, Val Evans and Gary Dowling.

Rob Tate  
Co-ordinator