

2 OVERVIEW

2.1 Introduction

In line with the objectives of the Intergovernmental Agreement on the Environment (1992), NSW Maritime is committed to promoting the sustainable and equitable use of NSW waterways for all users. Maritime emphasis in relation to sustainable environmental management is on inter-agency co-operation, sharing responsibilities and developing a consultative approach to sustainable waterway management.

The Intergovernmental Agreement is based on a broad set of principles for ecologically sustainable development including, inter alia:

- ◆ Inter-generational equity – the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations;
- ◆ Precautionary principle – Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- ◆ Conservation of biological diversity and ecological integrity should be a fundamental consideration.

NSW Maritime embraces these principles and adopts this partnership approach to environmental management by using a mix of regulation, enforcement and education as the primary tools to manage the environmental impact of vessels on the State's navigable waters. This approach to environmental management is implemented through:

- ◆ the development and implementation of boating management plans for individual waterways;
- ◆ educating the community about practices which can minimise boating impacts; and
- ◆ increased compliance powers under the Protection of the Environment Operations Act 1997.

Boating plans seek to ensure that boating procedures and practices maximise user safety, responsibility and enjoyment; identify and protect the recreational and environmental values of the waterway; and provide a consistent approach to existing and anticipated future issues.

The purpose of this boating management plan is to provide a framework for the management and administration of boating activities on the Tweed River and to establish more effective controls for boating and related activities where required. The plan addresses boating and associated impacts on environmentally sensitive areas such as vulnerable riverbanks, seagrass beds and important fish habitats.

2.2 Objectives

This Boating Plan (BP) is a 5 year plan designed to:

- ◆ be responsive to changing priorities and conditions on the estuary and to acknowledge boating and community expectations.
- ◆ ensure boating management practices maximise user safety and enjoyment while minimising adverse impacts on the environment.
- ◆ promote the provision of appropriate infrastructure.

Once developed, the plan is to provide a comprehensive body of information regarding boating and related activities on the Tweed Estuary, and the administrative structures within which these activities take place.

2.3 Guiding Principles

This plan is underpinned by the following principles, and as such will seek to:

- ◆ develop strategies that promote the safety of all waterway users.
- ◆ promote sustainable and equitable use of the waterway with the minimum of regulatory measures necessary to achieve this aim.
- ◆ manage boating activities to minimise detrimental environmental impacts and protect aquatic flora and fauna in accordance with the principles of Ecologically Sustainable Development as defined in the Environmental Planning and Assessment Act 1979.
- ◆ ensure best use of Government and community investment.
- ◆ contribute to sustainable resource management.

Strategies and actions identified in this Boating Plan are to be consistent with those responsibilities for which NSW Maritime has jurisdiction. (In accordance with the Ports Corporatisation and Waterways Management Act 1995, NSW Maritime has jurisdiction over navigable waters. The Act defines navigable waters as "... all waters that are from time to time capable of navigation and are open to or used by the public for navigation").

2.4 Governing Legislation

Activities on the Tweed River are controlled by a range of statutory instruments which are administered by a number of agencies.

The following instruments, State Government policies and directives apply to NSW Maritime in its administration of on-water activities on the Tweed River:

- ◆ Maritime Services Act 1935
- ◆ Commercial Vessels Act 1979
- ◆ Marine (Boating Safety – Alcohol and Drugs) Act 1991
- ◆ Marine Pilotage Licensing Act 1971
- ◆ Navigation Act 1901
- ◆ Ports Corporatisation and Waterways Management Act 1995
- ◆ Environmental Planning and Assessment Act 1979
- ◆ Marine Pollution Act 1987
- ◆ Protection of the Environment Operations Act 1997
- ◆ Protection of the Environment Operations (Noise Control) Regulation 2000
- ◆ Marine Safety Amendment (Random Breath Testing) Act 2005
- ◆ Rivers and Foreshores Improvement Act 1948
- ◆ Uniform Shipping Laws Code
- ◆ Coastal Protection Act 1979
- ◆ Heritage Act 1977
- ◆ NSW Coastal Policy
- ◆ Threatened Species Conservation Act 1995
- ◆ NSW Biodiversity Policy
- ◆ Protection of the Environment Administration Act 1991
- ◆ Fisheries Management Act 1994
- ◆ Fish Habitat Protection Plans
- ◆ State Rivers and Estuaries Policy
- ◆ Environment Protection and Biodiversity Conservation Act 1999

2.5 Holistic Management Context

The NSW Government's Estuary Management Policy recognises the ecological, social, and economic importance of the State's estuaries. The general goal of this policy is to achieve integrated, balanced, responsible, and ecologically sustainable use of these estuaries.

NSW Maritime embraces these principles, and inline with the objectives of the Intergovernmental Agreement on the Environment (1992), adopts a partnership approach to the management of the Tweed estuary.

Maritime shares the responsibility for protecting the environment in connection with the use of vessels on the State's waterways with other natural resource and environment management agencies. However, Maritime's direct responsibilities relate primarily to the management of commercial and recreational vessels on navigable waters. NSW Maritime carries out this responsibility with a view to achieving the highest possible standards of safety and protecting the marine and foreshore environment. In addition, Maritime assists in providing essential marine infrastructure.

Since 1991 the Tweed Shire Council, through its Tweed River Committee, has oversighted the preparation and implementation of detailed management plans for specific sections of the river and specific issues eg. river bank management. These plans define specific management actions and remedial works, many of which have been successfully completed over the past 12 years. In the context of holistic management of the Tweed Estuary, this Boating Plan will complement these existing plans and seek to develop specific strategies that promote the safety of all waterway users.

The following table lists the government agencies which have jurisdiction over boating and related matters on the Tweed River.

Boating Related Matter	Lead Agencies Responsible
<ul style="list-style-type: none"> • Marine Legislation • Marine safety and compliance • Provision and maintenance of navigation aids • Vessel traffic management • Mooring management • Pollution from vessels (including noise pollution) • Wash from vessels • Provision of funding for boating infrastructure in association with Council and the community. • Environmental education of the boating public 	NSW Maritime
<ul style="list-style-type: none"> • General water pollution (other than marine oil spills) • Large marina management (pollution issues) • Parking arrangements in the National Parks / Nature Reserves • Provision of toilets in the National Parks / Nature Reserves 	Department of Environment and Conservation (DEC) (Formerly EPA and National Parks and Wildlife Service)
<ul style="list-style-type: none"> • Wetland leases (private jetties, pontoons, ramps, slips) 	Council Department of Lands
<ul style="list-style-type: none"> • Routine navigational dredging for commercial fishing fleet • Provision of funding for boating infrastructure 	Department of Lands
<ul style="list-style-type: none"> • Catchment Management 	Northern Rivers Catchment Management Authority
<ul style="list-style-type: none"> • Protection of marine environments • Fishing closures and catches • Seagrass protection 	NSW Fisheries

Boating Related Matter	Lead Agencies Responsible
<ul style="list-style-type: none"> • Aquatic weed control • Aquatic reserve management 	
<ul style="list-style-type: none"> • Non-Maritime law enforcement • Search and rescue 	NSW Police
<ul style="list-style-type: none"> • Water supply, sewage and trunk drainage • Parking arrangements 	Tweed Shire Council
<ul style="list-style-type: none"> • Public wharves, jetties and boat ramps • Small marina approvals • Removal of river siltation • Fish cleaning facilities • Dredging project management • Stormwater management • River siltation • Small marina management • Local land use planning 	Tweed Shire Council

Other administrative roles on the Tweed River

Tweed River administration	Lead Agency	NSW Maritime's Role
Public marina applications	Tweed Shire Council & DIPNR under SEPP 71	Comment on navigational aspects of proposal; Issue swing mooring licences for approved marinas as appropriate.
Private marina applications	Tweed Shire Council & DIPNR	Comment on navigational aspects of proposal.
Provision of public boat ramps, jetties	Tweed Shire Council	Upon application from Council, may provide funding assistance; Comment on navigational aspects of proposal.
Marine pest control	NSW Fisheries	Assist NSW Fisheries as requested
Seagrass protection	NSW Fisheries	Ensure new moorings are not placed in sensitive seagrass areas; Educate boaters on how to avoid damaging seagrass.
Dredging	Department of Lands has licensing role & DIPNR has consultative and possible consent role under SEPP71	Comment on navigational aspects of proposals and provides a "watch and notify" service to Government.

2.6 Values Based Approach

A “values based” approach to the preparation of the Tweed Estuary Boating Plan enables the consideration of the important features, or the uniqueness, of the Tweed River and its immediate environment. This “values based” approach will ensure that, even though new issues may arise during the life of the plan, the plan itself will remain valid. This is based on the assumption that community values change relatively slowly (*Department of Land and Water Conservation, 1996*).

Submissions from the public consultation process provided Maritime with a broad range of information relating to the characteristics which the community values about the Tweed River and the associated issues which impinge upon these values.

All identified issues, together with desired outcomes and proposed strategies and actions, will be addressed in the body of this plan.

The community values associated with each of the identified issues can be categorised into one of the following three major areas:

- ◆ **Safety – (eg. speeding, bow riding, “distance–off” compliance, types & locations of navigational aids, channel hazards).**

The number of vessels on the Tweed estuary is increasing each year and this increased utilisation provides a greater challenge for NSW Maritime in managing the potential for more conflict and incidents, whilst ensuring safety on the waterway. (Total numbers of licence holders and registrations have increased by 37% and 28% respectively over the last 5 years). There is a continuing need for an increased understanding and commitment to water safety by all Tweed River users.



During 2004 NSW Maritime conducted, on average, one Safe Boating Seminar per month in the Tweed area and continued its comprehensive boating safety education program. The main issues addressed were the carrying of and access to safety equipment (particularly lifejackets), licence requirements, safety while crossing the entrance bar, capsizing, hypothermia and alcohol.

From July 2006 it will be compulsory for all persons seeking a boating licence to attend a Safe Boating Seminar prior to sitting the test.

Maritime will continue to monitor and analyse boating incidents on the Tweed to determine trends and causes that can then be addressed through such avenues as education and compliance campaigns, as well as increased on-water resourcing.

The lack of uniformity with regard to marine legislation and regulations between NSW and QLD has considerable impact on boating safety on the Tweed. The implementation of a national marine safety strategy for commercial and recreational vessels has been agreed to by the Australian Transport Council and is strongly supported by NSW Maritime. The aim of this strategy is to establish and sustain a harmonised national marine safety system based on uniform legislation, common standards for operators, vessels and marine safety infrastructure and mutual recognition between jurisdictions.

◆ **Environment – (eg. Noise, wash, erosion, pollution, habitat).**

Protection of the environment is a high priority for NSW Maritime. In line with the Intergovernmental Agreement of the Environment (1992) Maritime has a shared responsibility for the natural environment, with obligations for protecting wildlife, shorelines and beaches and protecting seagrass and fish spawning grounds.



Maritime's environmental initiatives have been enhanced by its designation as an Appropriate Regulatory Authority (ARA) under the Protection of the Environment (Operations) Act 1997

(POEO Act). This ARA status gives NSW Maritime jurisdiction to regulate and manage environmental impacts of vessels. It should be noted however, that this ARA status is in relation to water and noise pollution from vessels – not all environmental impacts.

Maritime discharges its duty of care over the Tweed Estuary by the establishment and monitoring of speed and wash restriction zones; policy development; contributions to the provision of infrastructure, and through the promotion of best practice. NSW Maritime's environmental education program is a primary tool in the promotion of best practice. The program is designed to highlight to the boating and wider community the potential impacts that boating can have on the aquatic environment and what can be done to minimise those impacts.

Maritime's Internet site has recently been enhanced with new information on items such as seagrass protection and vessel pump-outs. The environmental section of the NSW Safe Boating Handbook, which covers topics such as sewage discharge, garbage, seagrasses and boat wash, has also doubled in size. Around 200,000 copies are printed and distributed each year, and many thousands more are downloaded from the internet. Both these initiatives reflect Maritime's commitment to environmental protection.

◆ **Equity – (eg. user conflict, impacts of safety & environmental protection measures on commercial operators, infrastructure demands).**

The Tweed Estuary is a focus for a wide range of water related recreational and commercial activities. Public submissions highlighted the potential conflict between the expectations of different stakeholders on the Tweed. There is clearly a need to consider passive users of the waterway as well as accommodating the needs of commercial operators, and those wishing to boat, ski and fish on the river. Of equal importance is the amenity of those that reside near the foreshore.

The Healthy Rivers Commission Final Report, Williams River, 1996, states that as a goal of any plan of management, "There should be diverse opportunities for recreational uses of the river, but the pursuits of any one set of activities should not impose intolerable burdens on other, more passive recreational users and should not represent a threat to health, safety or the environment".

In line with this goal, the Tweed Estuary Boating Plan will endeavour to ensure the best safety, environmental, commercial and recreational outcomes in relation to use of and access to the Tweed Estuary.

3 THE TWEED ESTUARY AND ENVIRONS

3.1 Tweed Area Profile

Tweed Local Government Area covers 1303 square kilometres and adjoins the NSW shires of Byron, Lismore and Kyogle, with the NSW/Queensland border to its north. This border divides the twin towns of Tweed Heads and Coolangatta, which are an integral part of the metropolis of the Gold Coast.

Prior to European settlement, the area was blanketed in subtropical forest and was home to the Bundjalung people. Many of the area's towns and villages derive their names from the language of those original inhabitants. The area was settled by timber-getters around 1844 and by the 1890's the river port of Tumbulgum was the centre of population. The focus moved to Murwillumbah when the first Local Government municipality was declared in 1902. The Tweed Shire, which amalgamated the Municipality of Murwillumbah and Shire of Tweed, was declared in 1947. (www.tweed.nsw.gov.au)

The Tweed boasts a unique and diverse environment with Mount Warning being the centrepiece of the area. Mount Warning is a popular tourist destination and thousands of people each year climb the mountain to witness the first viewing of the sun as it hits the Australian continent. The surrounding McPherson, Tweed, Burringbar and Nightcap ranges form the caldera of the fertile Tweed Valley.



The Tweed Local Government Area comprises 37kms of natural coastline, wetlands and estuarine forests, lush pastoral and farm land, the entire basin of the Tweed River, and surrounding mountainous regions containing three world-heritage listed national parks.

The physical environment is complimented by a well established commercial/residential sector which is growing partly from the influx of tourists to the area each year and partly because Tweed

Heads has become a popular retirement destination. There were 73,821 people living in the Tweed area at the time of the last census (2001). The median age of the population is 44yrs and the largest cohort comprises those that are 65yrs and over (28%). This population is scattered though 17 villages, two towns, and the major urban areas of Tweed Heads and South Tweed.

Census figures reveal strong growth in the Tweed area over the last twenty years. In the 10 years to 2001 the local government area experienced an average annual growth rate of 2.8%. In real terms this equated to an increase in population from 55,953 in 1991 to 73,821 in 2001 (1.75 times higher than the average annual growth rate for NSW over the same period). With this average growth rate the population of the Tweed Local Government Area in 2009 is projected to be 84,792, although there is anecdotal evidence that the rate of growth may be increasing.

3.2 Tweed Estuary Physical Environment

Tweed Heads is located at the mouth of the Tweed River. The river forms the southern boundary of the Tweed Heads Township and flows to the sea immediately south of Point Danger, which forms part of the NSW/QLD border.

The Tweed River covers an area of 23 square kilometres with a catchment area of 1100 square kilometres. The main arm of the river is approximately 60km in length and is tidal to the Bray Park Weir located 4km upstream of Murwillumbah and approximately 30km from the entrance at Tweed Heads. Upstream of Murwillumbah the drainage pattern of minor tributaries is generally symmetrical due to the volcanic origin of the valley. Downstream of Murwillumbah the river winds through extensive floodplains.



The Tweed River entrance has a clear width of approximately 150 metres between the training walls. Immediately upstream of the mouth the river is controlled by revetments and is generally around 200-250 metres wide and up to 8 metres deep. It is somewhat wider near Fingal Head and

Chinderah and then becomes progressively narrower with distance further upstream. Near Murwillumbah the river is typically 120-140 metres wide with a depth generally less than 2-3 metres. Exceptions occur in local areas of the town reach where flow and associated flood flow scour has caused deeper water.

The major tributaries to the main arm of the Tweed River are the Rous River and the Terranora and Cobaki systems. The Rous River joins the main arm of the Tweed at Tumbulgum, and the Terranora and Cobaki systems join the river 2km upstream of the river mouth via Terranora Inlet and Ukerebah Passage.

"The ocean tide propagates into the Tweed River system and has an influence beyond Murwillumbah to the Bray Park Weir, a distance of approximately 30km. Previous studies show that the tide is progressively attenuated with distance upstream, although the most rapid attenuation occurs over the first 2-4 kilometres from the mouth of the river.

The main contributing tidal tributaries are the Terranora and Cobaki Creek systems. These both pass through expansive Broadwater areas in their upper reaches. They are connected to the main arm of the Tweed River predominantly via Terranora Inlet, which experiences relatively strong tidal flow, and also through Ukerebah Passage." (Hyder Consulting, Patterson Britton & Partners, WBM Oceanics, 1997, pp 4-2, 4-3).

3.3 Tweed Estuary Ecological Environment

The Tweed Shire area is considered to be part of one of the most diverse biogeographical regions in NSW in terms of its natural terrain, flora and fauna. It is unique from an ecological perspective as it is located on the boundary between the temperate and subtropical zones.

The estuary is a very important shorebird habitat for a wide range of avifauna including migratory shorebirds protected by international treaties with China and Japan. A number of shorebirds are listed on the schedules of the Threatened Species Conservation Act 1995, including the Little Tern, Pied Oystercatcher and the Beach Stone Curlew. Long term monitoring of bird populations has shown a steady decline in the number of birds using habitats within the Tweed Estuary. This decline is attributed to the loss and degradation of habitat and the increasing levels of human disturbance.

"Stotts Island Nature Reserve contains the last remnant of the Tweed River subtropical rainforest. The island is in good natural condition and diverse in flora species. It provides scope for ecological studies and is significant as it adds to the rainforest estate held by National Parks and Wildlife Service"

"Ukerebah Nature Reserve contains a range of representative estuarine successional saltmarsh and mangrove communities through to two patches of littoral rainforest and eucalypt open forest. The estuarine assemblages furnish significant feeding and breeding habitat for fish and crustaceans and are important foraging and roosting areas for migratory waders and for several species of mangrove and rainforest dependent birds"

The Ukerebah Ornithological area (Kirkwood Road East, Tweed Heads South) is home to *“four bird species, the Osprey Pandion haliaeetus, Rose-crowned Fruit-Dove Ptilinopus regina Collared Kingfisher Halcyon chloris and masked Owl Tyto novaehollandiae, which are listed as vulnerable and rare by the NSW National Parks and Wildlife Act (Schedule 12). The mud flats are also important feeding and roosting areas for migratory shorebirds which are protected by international treaties signed by the Australian Government and Japan (JAMBA: Japan-Australia Migratory Bird Agreement) and China (CAMBA: China-Australia Migratory Bird Agreement). The area has immense scientific and educational value relating to the study of coastal terrestrial ecology and estuarine ecology.”* (Register of National Estate, Australian Heritage Commission)

A number of different bird habitats are represented on the Estuary. These habitats range from open heaths and woodlands to mangroves, intertidal sand flats and ocean beaches. For example, areas of Letitia Spit are particularly important to waterbirds. Several of these species are important from a conservation perspective as they have specialised habitat requirements and suffer regular disturbance from beach users.

The estuary also comprises significant areas of saltmarsh, mangroves and seagrass beds. Seagrass beds provide food and shelter for a wide variety of fish and invertebrates. Many popular angling species use seagrasses as their nursery, before moving to other habitats as they grow. Seagrasses also help bind the riverbed and improve water quality. Terrestrial plant formations include littoral rainforest, fringing open forests, shrubland and heathland.

A rich and abundant marine fauna occurs within the estuary. The wetlands form an important habitat and nursery for many marine species and the river is home to an important commercial fish, prawn and oyster farming industry.

3.4 Tweed Estuary Usage

The Tweed River is the playground for many people living on the Gold Coast and as such is one of the busiest waterways in the State. As well as being an important focus of commercial and recreational activities within the Tweed Shire, the river plays host to a number of major aquatic events each year. These major events include:

- ◆ Tweed River Festival
- ◆ Charity Dragon Boat Race Day in November
- ◆ Classic Boats Festival
- ◆ Murwillumbah Rowing Club regattas
- ◆ Tweed River Bridge to Bridge Waterski Race
- ◆ ABRC Barefoot Ski Drags at Tumbulgum
- ◆ Volunteer Marine Rescue (VMR) Annual Fishing Competition in January
- ◆ Twin Towns Annual Fireworks Festival



AQUATIC EVENTS

Under the Water Traffic Regulations – NSW, Maritime may, upon application, grant an aquatic licence, either conditionally or unconditionally, permitting specific use of a section of waterway for a designated period of time. An aquatic licence is essential in order to conduct a race, display, regatta or an exhibition of waterskiing or similar activities, or where the use of a vessel restricts navigation.

In some cases the aquatic licence may authorise the holder to have exclusive use of the waterway and/or operate contrary to the regulations for that section of the estuary.

3.4.1 Recreational Activities

The Tweed River offers a diverse range of water-based recreational opportunities enjoyed by the majority of the Tweed River users. Recreational activities include:

- ◆ Fishing - in May 2002, NSW Fisheries introduced new restrictions on the operations of commercial fishers in the Tweed River. The following sections of the river are now designated recreational fishing havens:
 - Downstream from Boyd’s Bay Bridge and south of Rocky Point east to Fingal Road;
 - Wommin Lake and Wommin Lagoon;
 - Canal estates of Seagulls, Tweed Heads West, Blue Water, Crystal Waters, Endless Summer Estate and Oxley Cove.



The lower Tweed River is used by a large number of recreational fishers and has a reputation for being an excellent angling area. The river banks in this area are generally easily accessible attracting many anglers to fish from the shore. In contrast, most recreational fishing in the upper Tweed Estuary is vessel based, as riverbank access is more limited.

- ◆ Cruising or pleasure boating for sightseeing, fishing, picnicking and similar activities is popular in all reaches of the river.
- ◆ The opportunity for water skiing and related activities attracts both locals and tourists to the river. This type of activity is concentrated in the reach of the river adjacent to the Fingal Head Boat Harbour, Chinderah to The Piggery and Tumbulgum to the Commercial Road Boat Ramp upstream from the Murwillumbah Bridge.
- ◆ Personal Water Craft are particularly popular throughout the estuary and being of shallow draught, have traditionally only been restricted in areas of the river designated as 4 knot zones. The “wave-zone” area adjacent to the Jack Evans Boat Harbour is a popular PWC area due to the surf-like conditions created by the convex shape and wave current interaction effects on the entrance bar.
- ◆ There are two rowing clubs on the Tweed Estuary. The Tweed Heads Rowing Club is located adjacent to the Boyd’s Bay Bridge, with rowing predominately being enjoyed on Terranora Creek. The Murwillumbah Rowing Club is situated on the Condong to Murwillumbah reach of the river.
- ◆ Passive activities such as canoeing, sailing and kayaking are also popular on the Estuary.

3.4.2 Commercial Uses

The Tweed River hosts a variety of commercial activities including fishing, aqua farming, charters, and hire and drive operations. Table 1 categorises commercial activities on the river.

TABLE 1 – COMMERCIAL ACTIVITY

Commercial Activity	Number of Operators	Total No. of Vessels
House Boats	3	16
BBQ Boats	3	6
Small Hire & Drive eg "tinnies", kayaks	5	37
Charter Operations – River Only	3	5
Charter Operations – Offshore*	12	12
Professional Fishing – Inshore	20	28
Professional Fishing - Offshore	28	32

* includes whale watching vessels.

Offshore vessels account for 32% of all commercial vessels on the Tweed. They are primarily based on the Lower Tweed, for example at the Southern Boatharbour, and motor through the twin training walls to the ocean. This gives rise to a number of safety, environmental and equity issues which are addressed in detail under the appropriate management sections.

Inshore commercial vessels are predominantly of the hire and drive type such as houseboats, small tinnies and half-cabin cruisers, and make use of both the lower and upper Tweed. Safety issues arise as not all hire and drive users are experienced mariners, nor are they familiar with the Tweed and its many issues.

There are generally two types of commercial fishing operation, those that fish within the estuary, and those that fish in the open waters. Table 1 illustrates 20 inshore and 28 offshore commercial fishers operating in the Tweed area. It is worthy of note however, that three of these have both inshore and offshore vessels and that at any time the Tweed may be visited by vessels from other ports. Issues concerning fishers include the threat of diminishing hauling grounds and the encroachment of existing grounds by other users.

A number of issues associated with commercial vessels and proposed management strategies are addressed within each management section of this plan.

3.5 Vessel Activity / River Capacity

3.5.1 Lower Tweed Boating Study

The Lower Tweed Boating Study by Patterson Britton and Partners (PBP) 1997 calculated a potential peak daily demand for boating on the Tweed River. Peak daily demand was defined as the number of boaters using the waterway during the Christmas and Easter holiday periods. The strategy took into account variables such as vessel registrations to population, population increases at holiday times, the number of Queensland registered vessels using the Tweed, growth estimates for both population and vessel registrations, and an estimate of the number of registrations using the waterway at any one time. The findings are represented in Table 2:

TABLE 2 – BOATING DEMAND

Peak Demand	1996		2006	
	Lower limit	Upper Limit	Lower limit	Upper Limit
Current Demand¹	340	340	425	580
Potential Demand²	425	580	750	1310

¹ *Current Peak Demand - estimated peak daily demand (no. of boats) taking into account 1997 limitations of facilities and before improved entrance navigation conditions due to sand bypass system.*

² *Potential Peak Demand - estimated peak daily demand (no. of boats) if all facilities upgraded to have optimal condition and there are no navigation impediments.*

The lower limit represented potential daily demand and assumed there was no growth in terms of vessel registrations over the period. Conversely, the upper limit included a 3% annual growth rate over the same period. It also included a 60% loading for Queensland vessels and a component for the visiting population during holiday periods.

Predicted Versus Actual

Having the benefit of hindsight it has been possible to compare the actual level of boating activity with that predicted by PBP. There are a number of inconsistencies between the PBP model and the actual. The average annual population growth rate during the period between the 1991 and 2001 census is lower than that predicted, and conversely the actual growth rate for vessel registrations is higher than predicted. However, the largest anomaly lies in the predicted peak daily demand. During the January 2004 holiday period a tally of vessels was undertaken on the river, as well as a study of cars and boat trailers at each of the boat ramps. Table 3 explains:

TABLE 3 - PREDICTED TO ACTUAL

	PBP Prediction	Actual
Population of Tweed LGA (2001) [#]	80 000	73 821
Average Annual Population Growth	4.10%	2.81%
Vessel Registrations per 1000 Population (2001) [#]	22.6* 30.9*	35.3
Vessel Registration Growth Rate	3.00%	5.01%
Predicted Peak Daily Demand (2004) Recreational	407* 580*	277 [‡]

[#] The PBP report used data from the 1996 census as a base, and forecasted using population and registration growth rates to 2006. This plan used 2001 census figures and, to enable comparison, correlated the PBP data using their specified growth rates to 2001.

* Lower and Upper Limits as defined by PBP

[‡] Actual average number of recreational vessels during January 2004 (based on an audit of vessels being used on the river on the Australia Day Long Weekend in January 2004)

PBP used a value of 10% to determine the percentage of total registrations using the waterway at any one time. The actual average figure was 3.5% of total registrations held by people residing in the Tweed Local Government Area. In effect, PBP predicted between 197 and 310 (low and upper limits) Tweed based vessels using the waterway at any given time, while during January 2004 it averaged 99. (Note that these figures do not include Queensland vessels, which accounted for 64% of total vessels on the river). So while the number of registrations per 1000 population was actually higher than predicted, the PBP model appears to suffer from an overstated estimate of vessels using the waterway at any one time. This greatly affected the predicted potential peak daily demand.

3.5.2 Comparison of Tweed Shire to State Averages

Boating on the Tweed is more popular in terms of vessel registrations per 1000 population than the state average. The same can be said for the rate of growth for vessel registrations. The Tweed increases on average by 5.5% annually while the state average is 2.4%.

Additionally, there were 5,104 recreational boat licence holders residing in the Tweed Shire as at 01 July 2003. The average annual growth rate for boat licences since 1998 is 6.4%, again significantly higher than the state average.

TABLE 4 – VESSEL REGISTRATIONS

Tweed	Vessel Registrations & Population	NSW
2,605	Registrations - Recreational (2001)	177,671
73,821	Population (2001 census)	6,371,745
35.3	Registrations per 1000 population	27.9
44.1	Projection to 2009	29.8
	<u>Vessel Registrations</u>	
2,243	1998	157,978
2,360	1999	163,458
2,456	2000	169,576
2,605	2001	175,017
2,722	2002	177,671
2,864	2003	181,899
5.01%	Average Annual Growth Rate	2.38%
3,840	Projection to 2009	199,844

3.5.3 Vessel Activity – January 2004

Supplementing a range of data collected from Maritime’s management systems over the last five years, it was decided to undertake a detailed review of boating activity levels during January, with a concentrated review over the Australia Day long weekend, 24-26 January 2004. The long weekend was selected as it was considered from experience to be a typical peak boating weekend on the Tweed ie. mid-summer, school holidays and had warm fine weather ideal for boating activities. These conditions matched the PBP study’s criteria for what constituted peak daily demand. Findings included:

- ◆ An average of 252 recreational vessels were counted per day over the period and were located along the river from the entrance to the weir at Hindmarsh Flats; Terranora Inlet and Creek and both Cobaki and Terranora Broadwaters.

- ◆ Weekend activity on the study weekend was considered by the local Boating Officer, who has 13 years experience of peak boating activity on the Tweed, to be lower than for the same weekend in previous years. With the current growth trends in new licences and registrations it was deemed appropriated to inflate the total of vessels counted by a conservative 10%. This would increase the total number of vessels to 277; still significantly lower than the predicted annual daily demand in the PBP *Lower Tweed Boating Study 1997*.

- ◆ The different types of activity being undertaken by boaters are summarised in Table 5.

TABLE 5 – VESSEL ACTIVITY 2004

Activity	Vessels	%
CRUISING	105	37.8%
FISHING	70	25.3%
MOORED	4	1.6%
SAILING	1	0.4%
SKIING	43	15.5%
WAKEBOARDING	18	6.7%
PWC	35	12.7%
Grand Total	277	100.0%

- Cruising, fishing and towing (skiing, wakeboarding, etc) were the most popular activities.
- 22.0% of boaters were involved in towing e.g. skiing, wakeboarding, tubing etc.
- The proportion of PWCs to other vessels (12.6%) was significantly higher than the NSW state average of 3.1%.
- The number of anchored vessels did not include those on private mooring licences; they were more likely houseboats etc temporarily anchored.

Queensland Boaters

The *Lower Tweed Boating Study 1997* estimated that the number of Queensland boaters on the Tweed at any given period was 60% of all boaters. Table 6 shows a break-up of NSW and Queensland registered vessels counted over the survey period. As can be seen, 64.4% of all recreational vessels were registered in Queensland, only marginally more than PBP's estimate of 60%.

TABLE 6 – NSW & QLD

Activity	NSW	QLD	Total
CRUISING	39	66	105
FISHING	36	34	70
MOORED	2	2	4
SAILING	0	1	1
SKIING	12	31	43
WAKEBOARDING	3	15	18
PWC	7	29	35
Grand Total	98	178	277
%	35.6%	64.4%	100.00%

In 2000, the Queensland Government passed the Transport Infrastructure (Gold Coast Waterways) Management Plan 2000. Included were a number of restrictions relating to the mooring of vessels, speed in creeks and rivers, water skiing and the use of personal water craft. Waterways listed in

the Plan included the Pimpama, Coomera and Nerang Rivers, Currumbin and Tallebudgera Creeks and sections of the Broadwater.

The flow-on effect of these restrictions in terms of increasing the number of QLD registered vessels on the Tweed would require a more detailed investigation involving the 23,479 registration holders living in the Gold Coast City Council area. However, 4 years after this legislation was introduced it was found that, on average, only 0.76% of these boaters were boating on the Tweed at any time over the survey period. Additionally, the number of Queensland registered vessels counted on the Tweed was only 4.4% more than that estimated in the Lower Tweed Boating Study undertaken in 1997. It would appear that the restrictions imposed by the Queensland Government in 2000 have had minimal effect on the level of vessel activity on the Tweed Estuary.

The local Maritime BSO advised that in his experience a large proportion of Queenslanders that boat on the Tweed reside south of Tugun on the Gold Coast. The result in terms of this plan is that any education programs being recommended should be extended to target those boaters from at least the lower half of the Gold Coast City Council area.

3.5.4 Vessel Activity by Management Section

As mentioned earlier in the plan, the Tweed River has been divided into management sections. The Table 7 illustrates the sections of the river that were frequented by boaters over the period and the types of activities in which they were involved.

TABLE 7 – VESSEL ACTIVITY BY MANAGEMENT SECTION

Area	Cruising	Fishing	Moored	Sailing	Skiing	Wakeboard	PWC	TOTAL	Total %
B004AA	20	9	0	0	0	0	5	34	12.1%
B004AB	9	4	0	0	2	0	4	19	7.0%
B004AC	2	4	0	0	1	0	1	9	3.1%
B004AD	12	12	0	1	1	2	3	32	11.4%
B004AE	2	3	0	0	1	0	0	7	2.4%
B004AF	4	1	0	0	4	2	1	13	4.7%
B004AG	0	0	0	0	0	0	0	0	0.0%
B004AH	13	4	0	0	12	10	11	51	18.3%
B004AI	7	1	2	0	7	3	4	24	8.6%
B004AJ	2	1	2	0	14	0	3	23	8.2%
B004BA	10	7	0	0	0	0	3	20	7.0%
B004BB	18	15	0	0	0	0	0	33	11.9%
B004BC	6	9	0	0	0	0	0	14	5.2%
B004BD	0	0	0	0	0	0	0	0	0.0%
Grand Total	105	72	4	1	43	18	35	277	100%

B004AA – Entrance to Entrance Terranora Inlet

B004AB – Ukerebagh Is to Rocky Point

B004AC – Rocky Point to Barneys Point Bridge

B004AD – Barneys Point Bridge to Tweed Broadwater

B004AE – Tweed Broadwater to Rawson Island

B004AF – Rawson Island to Tumbulgum Boat Ramp

B004AG – Rous River

B004AH – Tumbulgum Ramp to Condong Ramp

B004AI – Condong Ramp to Murwillumbah Bridge

B004AJ – Murwillumbah to the Weir

B004BA – Terranora Creek to Dry Dock

B004BB – Dry Dock to Big Island

B004BC – Terranora Broadwater

B004BD – Cobaki Broadwater

- The most frequented area proved to be Tumbulgum with 18.3% of all vessels on the estuary. This area is especially popular with skiers, wakeboarders, PWC and vessels pleasure cruising.
- Other sought after areas included B004AA, B004AD, B004BB, B004AI and B004AJ; the latter two being particularly popular with waterskiers.
- Individual management sections will be analysed in detail later in the plan.



Carrying Capacity

The Lower Tweed Boating Study 1997 stated that the total waterway available to recreational boating (excluding Terranora Inlet) was approximately 650 hectares. (p.28). Also stated was that vessels involved in waterskiing required approximately 5 hectares of water space per vessel (Soro–Longworth & McKensie, 1977) and other recreational vessels 1.2 hectares each (Public Works Department 1988).

The Table 8 shows the capacity currently utilised and that predicted for 2006 (to correlate with PBP figures) and 2009 (for the life of this plan).

TABLE 8 – RIVER CAPACITY

	2004		2006		2009	
	Number	Hectares	Number	Hectares	Number	Hectares
Water skiing # @ 5ha / vessel	61	305	67	335	78	390
Other river uses @ 1.2ha / vessel*	149	179	164	197	190	228
Total	210	484	231	532	268	618

Includes all towing activities e.g. waterskiing, wakeboarding, aquaplaning etc.

* The Lower Tweed Boating Study excluded the Terranora Inlet. Vessel numbers from Jan 2004 have been reduced accordingly.

The table shows that current and future boating activity, at least for the life of this plan, comes significantly under the Lower Tweed Boating Study's estimation of the river's carrying capacity.

It should be noted, however, that the above exercise is based on activity over the entire estuary (excluding Terranora Inlet), yet Table 7 illustrates that management sections vary greatly in terms of vessel traffic and activity.

Vessel Activity & River Capacity – Conclusion

The Lower Tweed Boating Study 1997 estimated that there were 340 boats per day using the river in 1996. The study also stated that "recreational boating on the Lower Tweed is likely to increase significantly in the next 10 years, largely due to safer entrance conditions and improvements to boating facilities that are likely to ensue." It was projected that as a result of these improvements, and the construction of a regional boating facility, the 2006 peak potential lower limit would increase to 750 recreational boats per day.

By January 2004 the installation of the sand bypassing system had improved navigable conditions for those boaters accessing the ocean, and there have been a number of improvements made to ramp facilities. Yet the actual average peak boating demand in January 2004 was 277 recreational boats per day. Further, with existing growth rates in terms of population and registrations this figure would increase to only 305 in 2006 and 354 in 2009 (the end of the planning period). These figures fall significantly short of the estimated peak daily demand as identified in The Lower Tweed Boating Study 1997.



Lastly, the figures quoted so far in terms of boating activity have been based on the overall use of the river, and while these figures represent numbers of vessels per day it should be remembered

that activity varies greatly from location to location. Table 7 has shown that some management sections are more popular with boaters than others and, therefore, require varying management strategies and responses. Specific management strategies will be addressed in the relevant management sections of this plan.

3.6 Boating Safety

NSW Maritime has two permanent full-time Boating Service Officers (BSO), the second officer commencing duty in November 2004 and one permanent part-time Customer Service Officer (CSO) located in the Tweed Heads operational area. During the peak boating period (Easter Long Weekend, October – February) additional BSO resources are transferred into the area to assist with boater compliance, and the Customer Service Centre operates on a full-time basis during December and January.

The Tweed Heads operational area comprises the waterways of the Tweed River; Rous River; Brunswick River; Cudgen, Cudgera and Mooball Creeks; Cudgen Lake; Cobaki and Terranora Broadwater and the Coral Sea out to three nautical miles off the coast. The Boating Service Officer has responsibilities across all operational aspects of boating in these many and varied waterways.

Regular on-water patrols are one of the primary functions of the BSO. These involve the BSO undertaking patrols and inspections of recreational and commercial vessels to ensure continuing compliance with the requirements of licensing, registration, speed limits, aquatic events, noise and other forms of pollution. In cases where the legislative requirements are not met the BSO may issue a verbal or formal warning, an infringement notice, or a summons for court attendance, depending on the severity of the offence.



Houseboating

The officer also provides community education by way of education programs covering the broad spectrum of recreational boating matters, with particular emphasis on boating safety, pollution

control and management of waterways to improve the standard of boating safety awareness and waterways amenities in the general community.

The Boating Service Officer is also responsible for recommending the placement and maintenance of navigation aids and systems to assist safe navigation; completing boating incident and accident reports, undertaking investigations; mooring placement and management; and undertaking environmental assessments for wetland lease applications.

3.7 Compliance History

3.7.1 Complaints

Along with other sources of management information such as incidents, accidents, court attendances, infringements and formal warnings, complaints provide important information that is used to determine management strategies for all NSW waterways.

Complaints from the public are recorded on NSW Maritime’s Management Information System and are valued as an important stakeholder feedback mechanism.

◆ **Complaint Types**

There were 908 complaints recorded by NSW Maritime’s Tweed Heads Service Centre over the period 30.06.1998 to 30.06 2004. Figure 1 shows all complaints by type for the period. It should be noted that a single complaint can relate to more than one type or issue, for example complaints about distance (known as “distance-off”) can also include wash and/or safety elements.

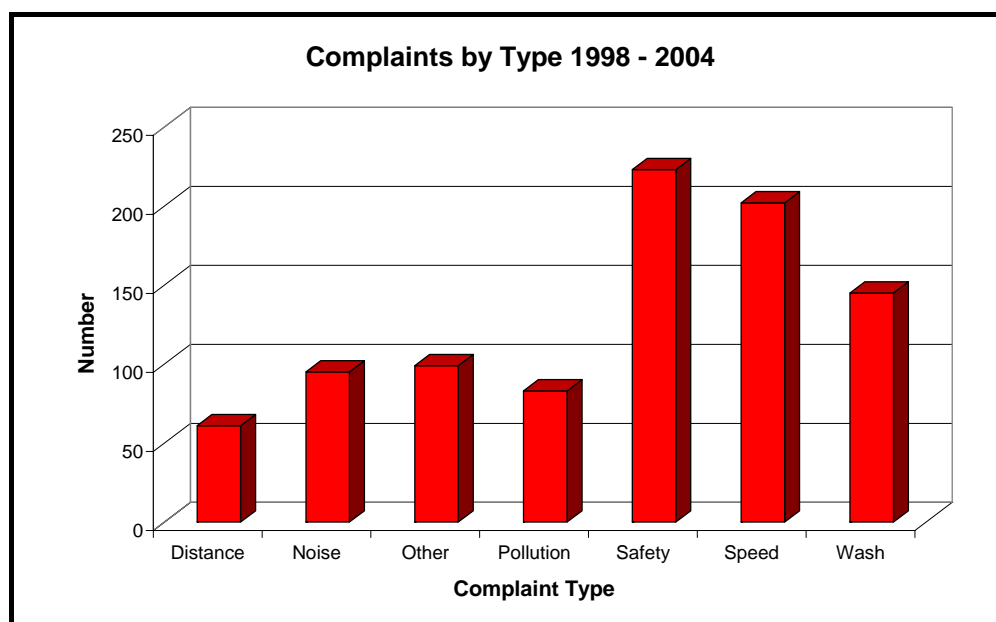


Figure 1

Figure 1 shows that safety, speed and wash accounted for the majority of complaints (over 63%) during the period.

◆ **Complaints by Management Section**

Figure 2 illustrates the numbers of complaints by management section for the period 1998 – 2004.

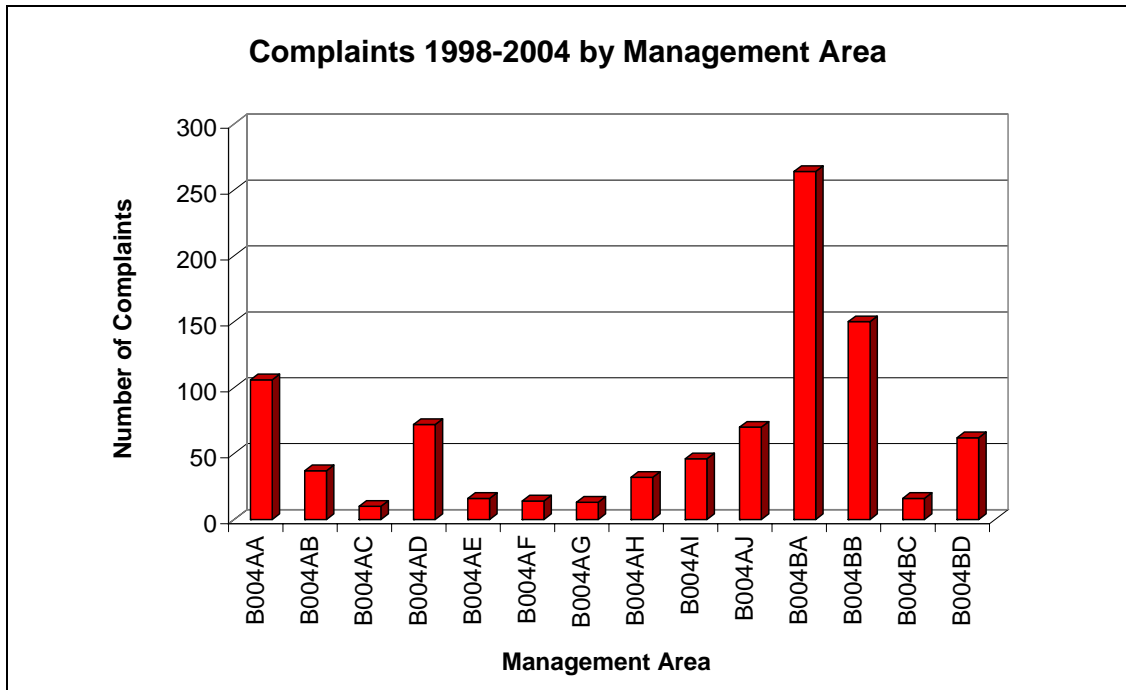


Figure 2

- | | |
|---|--|
| B004AA – Entrance to Entrance Terranora Inlet | B004AH – Tumbulgum Ramp to Condong Ramp |
| B004AB – Ukerebagh Is to Rocky Point | B004AI – Condong Ramp to Murwillumbah Bridge |
| B004AC – Rocky Point to Barneys Point Bridge | B004AJ – Murwillumbah to the Weir |
| B004AD – Barneys Point Bridge to Tweed Broadwater | B004BA – Terranora Creek to Dry Dock |
| B004AE – Tweed Broadwater to Rawson Island | B004BB – Dry Dock to Big Island |
| B004AF – Rawson Island to Tumbulgum Boat Ramp | B004BC – Terranora Broadwater |
| B004AG – Rous River | B004BD – Cobaki Broadwater |

As can be seen, over half (57.7%) of all complaints registered for the Tweed Estuary related to areas B004BA, B004BB and B004AA. Interestingly, while these areas attracted the most complaints, they ranked quite low in terms of vessel activity, with B004BA and B004BB having 7.0% and 11.9% respectively. (Refer Table 7). One explanation is that these areas are located adjacent to some of the densest residential areas on the estuary and include the major canal estates.

As complaints are generally location specific, strategies adopted by Maritime are detailed in each of the relevant management sections.

3.7.2 Infringements and Formal Warnings

NSW Maritime’s Boating Service Officer conducts regular on-water patrols and is responsible for ensuring compliance with legislative requirements. In cases where the legislative requirements are not met, the BSO may issue a verbal or formal warning, an infringement notice, or a summons for court attendance, depending on the severity of the offence.

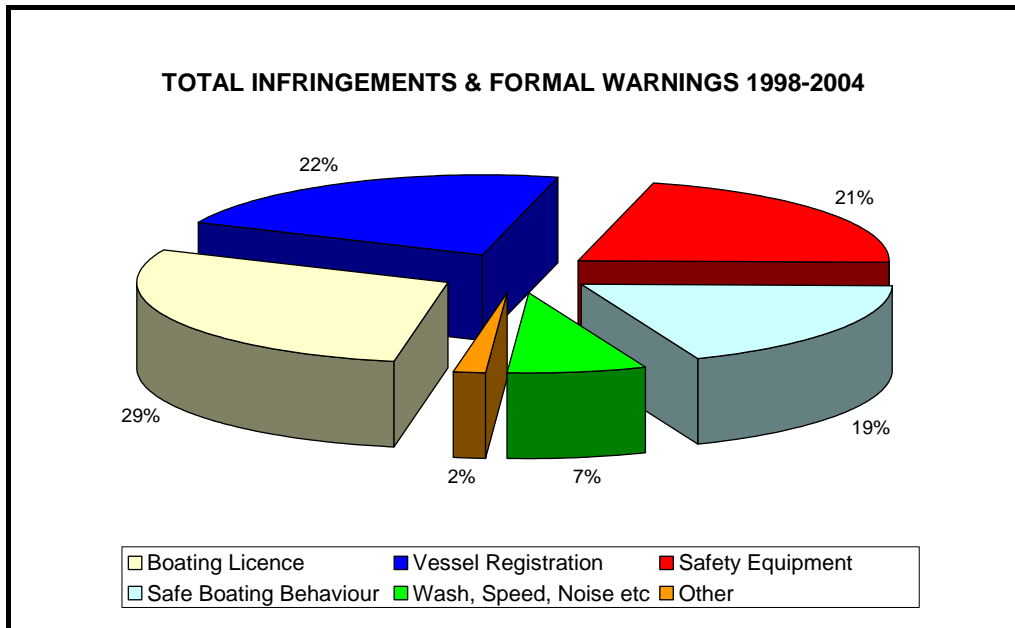


Figure 3

Figure 3 provides a breakdown of the general categories of offence that result in the issuing of either an infringement or a formal warning. These fall into two main categories:

- Safety – Accounting for 72.4% of all infringements and formal warnings, and are issued for lack of a boating licence, inadequate or missing safety equipment.
- Behaviour – Accounting for 27.6% of total infringements and formal warnings and are issued for unsafe boating behaviour, excessive noise, wash, speed etc.

It should be noted that PWC accounted for 25.1% of all infringements issued over the 1998-2004 period.

3.7.3 Infringements & Formal Warnings to Complaints

Figure 4 illustrates the relationship between the number of complaints received and the number of infringements and formal warnings issued by Maritime over the period 1998 – 2004.

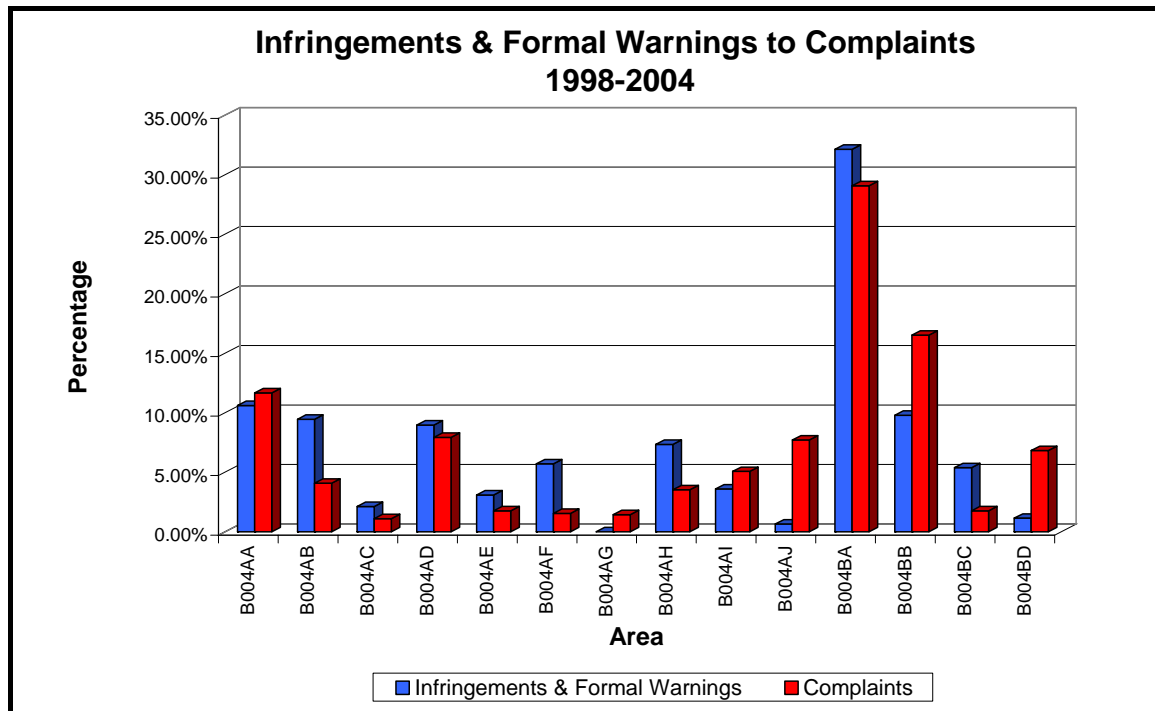


Figure 4

- | | |
|---|--|
| B004AA – Entrance to Entrance Terranora Inlet | B004AH – Tumbulgum Ramp to Condong Ramp |
| B004AB – Ukerebagh Is to Rocky Point | B004AI – Condong Ramp to Murwillumbah Bridge |
| B004AC – Rocky Point to Barneys Point Bridge | B004AJ – Murwillumbah to the Weir |
| B004AD – Barneys Point Bridge to Tweed Broadwater | B004BA – Terranora Creek to Dry Dock |
| B004AE – Tweed Broadwater to Rawson Island | B004BB – Dry Dock to Big Island |
| B004AF – Rawson Island to Tumbulgum Boat Ramp | B004BC – Terranora Broadwater |
| B004AG – Rous River | B004BD – Cobaki Broadwater |

It is evident that a general correlation exists within each management section between the number of complaints received and the number of infringements and formal warnings issued.

The strategies adopted within this plan will maintain this level of correlation and ensure that all complaints are investigated and subsequent appropriate action taken.

3.7.4 Accidents / Incidents

There were 29 accidents/incidents recorded on Maritime's database over the 1998-2004 period. The majority of these (48%) occurred in management section B004AA (River mouth to the entrance at Terranora Inlet); 28% in Terranora Inlet / Terranora Creek management section, and the remaining 24% were evenly distributed along the remaining reaches of the river. Only 17% of all recorded incidents resulted in injury.

The safe passage into the Tweed River has been significantly improved following the establishment of the sand bypass system, however the Tweed Bar still presents as a navigation hazard for boaters. State-wide there have been 63 recorded boating incidents and six deaths at ocean bars since 1 January 2000, with more incidents having occurred at Tweed Heads than at any other bar.

4 COMMUNITY CONSULTATION

NSW Maritime is acutely aware that this Boating Plan must reflect community values, address community issues and have broad community endorsement. As a result, October 2003 saw the commencement of a community consultation program inviting the Tweed residents, and other interested stakeholders to be involved in the planning process. Key Government Agencies were also consulted and invited to make written submissions outlining values and issues peculiar to their area of expertise.

The community consultation phase involved:

- ◆ The release of a Discussion Paper on 28th October 2003. This Discussion Paper outlined Maritime's objectives, gave examples of issues identified from preliminary research and invited all stakeholders to contribute to the planning process.
- ◆ Advertisements for the Discussion Paper were placed in two issues of the Tweed Link (Tweed Shire Council's weekly newsletter), and publicised via a media release in SEQ and northern NSW newspapers.
- ◆ Copies of the Discussion Paper were mailed, on request, from Maritime's Regional Office at Coffs Harbour; could be downloaded from the Maritime website; and were placed at the Tweed Shire Council, the Tweed Civic Centre, and NSW Maritime's Tweed Heads Service Centre.
- ◆ The Discussion Paper was presented to members of the Tweed River Committee by the Tweed Estuary Boating Plan team.
- ◆ A presentation outlining the objectives of the plan and the planning process was given to interested community members by Maritime's North Coast Regional Manager at the Tweed River Forum. This presentation was held at the Tweed Civic Centre in November and was part of the calendar of events celebrating the Tweed River Festival.
- ◆ A meeting with waterskiing representatives in September 2004
- ◆ A meeting with Tweed River Charter Operators Association in September 2004
- ◆ A structured campaign for the release of Draft BP including:
 - 3 successive weekly advertisements in the Tweed Link
 - Articles in Tweed Heads and Gold Coast print media
 - News items on Prime TV
 - Meetings with residents, the Murwillumbah Rowing Club and Houseboat Operators.
- ◆ The release of the Draft Plan on 20th August 2004 with a closing date for submissions being the 8th October 2004. Following feedback from stakeholders the closing date was extended to 31st October 2004 however the Authority accepted late submissions well into 2005.
- ◆ A meeting on 1st August 2005 with a wide variety of stakeholder groups prior to the final approval of the plan. The objective of this meeting was to review the major issues raised by

stakeholders and present NSW Maritime's proposed strategies. This forum provided the opportunity for stakeholder groups and NSW Maritime to arrive at the best possible outcomes based on compromise under the principles of boating safety, environmental responsibility and equity for all users.

The following table illustrates the number of submissions received from stakeholders in response to the Discussion Paper and the Draft Plan.

TABLE 9 – Submission numbers

Submission Type	Discussion Paper	Draft Plan
Govt Agency	6	3
Non-Govt Agency	28	101
Form Letters	0	256*
Petitions	1 (66 signatories)	1 (22 signatories) 1 (94 signatories)

* Seven form letters were not counted as the signatories were unidentifiable.

The key values and issues arising from the submissions included:

- ◆ River Health
- ◆ Habitat Protection
- ◆ Ability to pursue activities on the river in a fair and equitable manner
- ◆ Protection of the river banks
- ◆ Adequacy of boating infrastructure
- ◆ Amenity of foreshore residents
- ◆ Safety

For a complete summary of stakeholders' submissions and NSW Maritime responses refer Appendix A - "Stakeholder Submissions Matrix – NSW Maritime's Response"

5 MANAGEMENT PLAN STRUCTURE

NSW Maritime's Management Information System for the Tweed River is divided into 14 management sections (each with an alpha-numeric identifier). Information and data pertaining to all operational aspects of the river's management, from compliance to navigation aids and mooring management, is recorded in the relevant management section.

The Tweed Estuary Boating Plan will reflect these management sections, with all values, issues and resultant management strategies and actions, being addressed within each section.

5.1 Management Sections

The following sections of the report detail the values, issues, management strategies and action plans relating to each section of the river. Entire Estuary concepts are presented initially, followed by detailed assessment in accordance with the 14 management sections of the Tweed Estuary listed below:

- B004AA – River mouth to Terranora Inlet entrance
- B004AB – Ukerebagh Island to Rocky Point
- B004AC – Rocky Point to Barney's Point Bridge
- B004AD – Barney's Point Bridge to Tweed Broadwater
- B004AE – Tweed Broadwater to Rawson Island
- B004AF – Rawson Island to Tumbulgum Bridge
- B004AG – Rous River
- B004AH – Tumbulgum Bridge to Condong Ramp
- B004AI – Condong Ramp to Murwillumbah Bridge
- B004AJ – Murwillumbah Bridge to the Bray Park Weir
- B004BA – Terranora Creek / Tweed River confluence to Dry Dock
- B004BB – Dry Dock to Big Island
- B004BC – Terranora Broadwater
- B004BD – Cobaki Broadwater

5.2 Timeframe

From the values and issues obtained during the consultation phase of the development of this plan, a series of desired outcomes for the Tweed Estuary were developed. The strategies and actions presented in the following sections of this plan have been developed in order to achieve these desired outcomes.

The implementation of these strategies and actions will be staged over the five year life of the plan in accordance with the following timeframes:

- **Short Term:** The initiative is anticipated to be implemented within one year of the adoption of this plan.
- **Medium Term:** The initiative is anticipated to be implemented within three years of the adoption of this plan.
- **Long Term:** The initiative is anticipated to be implemented within the first five-year cycle of this plan.
- **Ongoing:** This relates to projects which will be implemented on a recurring and/or "as required" basis.

5.3 Review Period

The strategies and actions adopted in this Tweed Estuary Boating Plan are designed to be responsive to changing priorities and conditions on the estuary, and as such will be subject to ongoing review during the five year life of the plan.

The subsequent five year planning cycle will commence with Maritime undertaking a formal review of all strategies and actions adopted in this plan.

6 ESTUARY-WIDE CONCEPTS AND STRATEGIES

The retirement of the “baby boom” generation together with the rapidly growing population of the Tweed area will inevitably result in increased river usage by all stakeholders, with the potential for increased pressure on the environmental and ecological habitats of the estuary.

Unless well managed, increased boating may result in increased pollution of the waterway, significant impacts on marine and riparian flora and fauna, impacts on existing fish stocks, and heightened safety and equity issues.

The community’s concern in relation to these potential impacts was clearly reflected in the public submissions received by Maritime.

NSW Maritime appreciates this concern, and through its management plan, seeks to ensure that boating procedures and practices maximise user safety, protect environmental values and provide a consistent approach to existing and anticipated future issues.

The following values and issues were identified through the public consultation phase and are common to all sections of the Tweed Estuary. These identified values and issues, and the resultant management strategies and actions are addressed in this section of the plan and, where applicable, detailed in the location-specific management sections.

6.1 River Health

All stakeholder groups value the Tweed River as one of the area’s greatest assets. They view the health of this asset as being vital to its ability to support the environmental, economic and social values of the community.

6.1.1 Issue:

Without appropriate management strategies, increased boating on the estuary has the potential to result in increased pollution of the waterway. Community concerns relate primarily to potential increases in the discharge of sewage, bilge water, oil/fuel spillage, or general litter, both in the water and around service facilities.

The University of Queensland in its health report titled Waters of the Tweed IV (Spring 2003) gave the estuary as a whole an overall health rating of C+. As a result, many residents have pledged their support to the following vision:

“... Tweed estuary and its catchment waterways will, by 2025, be healthy, supporting the livelihoods and lifestyles of all residents, and will be achieved and maintained by everyone working together.”

6.1.2 Management Strategies:

The need to maintain or improve aquatic ecosystems, visual amenity and water quality for primary and secondary contact recreation was outlined in the Water Quality and River Flow Interim Environmental Objectives for the Tweed River Catchment. NSW Maritime has adopted management strategies in line with these objectives.

◆ ***“Sewage Pollution from Vessels” Strategy***

Although it is recognised that the greatest contributors to poor water quality are the stormwater, septic and sewerage systems, discharge of sewage and other pollutants from vessels may contribute to poor water quality. Water quality degradation due to the impacts of boating is being addressed through Maritime’s “Sewage Pollution from Vessels” strategy.

The Marine Pollution Regulation 2001 has been recently amended to improve the management of sewage pollution from vessels. These new statutory requirements came into effect on 1 July 2003 and are the culmination of an extensive public consultation process arising from Maritime’s Sewage Pollution from Vessels Discussion Paper.

The key initiatives include:

- a recognition of the fact that under the Marine Pollution Regulation 2001 the discharge of untreated sewage into a no discharge zone is prohibited.
Note: The entire Tweed Estuary is a no discharge zone for both treated and untreated sewage;
- a requirement under the Marine Pollution Regulation 2001 that passenger-carrying commercial vessels and houseboats install toilets and holding tanks to prevent the discharge of sewage in all NSW waterways;
- prevention of the discharge of treated sewage into certain environmentally sensitive waters (so-called ‘no discharge zones’).
- the designation, under the Marine Pollution Regulation 2001, of a 500 metre buffer from environmentally sensitive areas for the discharge of treated sewage. (This effectively makes the whole of the Tweed Estuary a no-discharge zone for both treated and untreated sewage); and
- an education campaign to inform the boating community of its responsibilities in managing sewage pollution from vessels.

NSW Maritime has implemented the holding tank requirements and is working with vessel operators and other stakeholders to ensure compliance.

◆ **No Discharge Zones**

The entire Tweed Estuary is a “No Discharge Zone” for both untreated and treated sewage. The management strategies adopted in this boating plan are aimed, inter alia, at eliminating effluent discharges from vessels and encouraging the provision of appropriate infrastructure such as toilets and pump out facilities in high use areas.

◆ **Compliance Program**

NSW Maritime’s environmental initiatives have been enhanced by its designation as an Appropriate Regulatory Authority (ARA) under the Protection of the Environment Operation Act 1997 (POEO Act). This ARA status gives Maritime power to regulate environmental impacts of vessels. It should be noted that this ARA status is in relation to water and noise pollution from vessels – not all environmental impacts.

In cases where the legislative requirements are not met the Tweed Heads Boating Service Officer may issue a verbal or formal warning, an infringement notice, or a summons for court attendance, depending on the severity of the offence.

◆ **“Holding Tank” Audit Program**

In February 2002 the region’s Senior Boating Service Officer commenced an audit program aimed at ensuring all Class 1, (Passenger Carrying), commercial vessels comply with the holding tank requirements under the Marine Pollution Regulation 2001.

Vessels were audited to ensure:

- the presence of a holding tank;
- appropriate connection of the holding tank within the hull of the vessel;
- pump out locations comply with the Act; and
- log books are up to date and record pump-out times, locations and quantities.

This is an ongoing compliance program that will be expanded to encompass Class 1, Class 2 (working vessels eg. tugs, dive boats), Class 3 (commercial fishing vessels) and Class 4 (hire boats eg houseboats) vessels, as well as recreational vessels, during the life of this plan.

With minimal impost on operators, the holding tank audit will also serve to reassure all user groups that the river’s commercial and recreational vessels are active in ensuring that the river continues to support the livelihoods and lifestyles of all residents for generations to come.

◆ **Moorings**

All mooring applications are subjected to a rigorous environmental assessment process to promote the environmentally responsible management of sewage wastes.

◆ **Pump-Out Facilities**

The greatest potential for pollution resulting from vessels with toilet facilities exists in the vicinity of berthing facilities.

NSW Maritime strongly recommends that all Development Approvals for new berthing facilities, such as marinas, must be subject to the inclusion of pump-out facilities.

NSW Maritime supports stakeholder comments in relation to the need for an additional pump-out facility in the mid-upper estuary. As a short-term strategy of this management plan NSW Maritime will recommend that Tweed Council investigate an appropriate location for an additional pump-out facility.

Maritime also concurs with a recommendation from the Lower Tweed Boating Study, that all developments containing fuelling facilities, or workshops, should have satisfactory safeguards to prevent widespread contamination of the waterway due to oil and fuel spillage.

◆ **Education**

As the majority of boating related pollution results from carelessness, a greater public awareness and understanding would reduce potential water quality problems significantly (Lower Tweed Boating Strategy 1997). NSW Maritime’s education campaign is one of its primary strategies in relation to protection of the marine environment. The education program is designed to highlight to the boating and wider community the potential impacts that boating can have on the aquatic environment and what can be done to minimise those impacts. Maritime provides environmental information through the Internet, as well as through brochures (eg. Leave Only Water In Your Wake, and Take Charge of Your Discharge), the print media, radio and seminars. In 2003 it worked with the Environment Protection Authority to produce the “It’s a Living Thing” television campaign designed to promote care and protection of the environment.

NSW Maritime has also provided material to schools through the Australian and New Zealand Safety Boating Education Group. This program, entitled Kids and Water, has introduced marine safety and environment education to over 270 NSW primary schools including eight in the Tweed Heads area.

6.1.3 Action Plan

Action	Time Frame
◆ Review audit findings, identify non-conformances, ensure compliance and monitor follow-up actions.	Short Term
◆ Initial audit of all Class 4 vessels.	Short Term

◆ Initial audit of Class 2 and Class 3 vessels.	Medium Term
◆ Recommend to Council the installation of automatic measuring/monitoring devices at all pump-out facilities.	Short Term
◆ Once installed, undertake regular audit of pump-out readings.	Ongoing
◆ Continue the rigorous application of ESD principles to mooring application by way of thorough environmental assessments, especially in relation to sewage management.	Ongoing
◆ Continue education campaign to inform the boating community of its responsibilities in managing sewage pollution from vessels.	Ongoing

6.2 Habitat Protection

All stakeholder groups recognise the value of protecting habitat areas vital to a variety of aquatic, avian and terrestrial species.

6.2.1 Issue:

A rapidly growing population could expect the Tweed Estuary to provide increased opportunities for boating access, tourism and passenger transport. The increase in boat usage on the estuary will potentially put pressure on the environmental and ecological habitats of the estuary.

Significant habitat areas include the Cobaki and Terranora Broadwaters, Ukerebah Passage, Kerosene Inlet, Wommin Lake & Wommin Lagoon, Shallow Bay, Tweed Broadwater and Stotts Island Nature Reserve.

6.2.2 Management Strategies:

NSW Maritime recognises the high conservation value of these areas and through its management strategies endeavours to achieve an appropriate balance between education, legislation and enforcement.

◆ *Existing Plans*

Habitat conservation has been one of the primary objectives of all previous Tweed River management plans. In the context of holistic management, this boating plan will complement

existing plans, and as such, management strategies in relation to habitat conservation will be consistent with those of previous management plans.

Increased boating on the river would increase use of foreshore destinations for recreational boaters, such as sandy beaches, picnic areas and walking trails. Hence there is a need to plan additional facilities, so that impacts on riparian vegetation are minimised. The Tweed Estuary Management Plan provides for additional boating facilities (ramps, jetties, pump-out facilities, landing beaches), which are integrated with rehabilitation of riparian flora, creation of new areas of habitat, as well as bank protection, and educational ecology-based, land-based facilities such as walking trails, picnic facilities and viewing areas. Hence, there should be no degradation of significant areas of marine and riparian flora. (Lower Tweed Boating Strategy).

◆ **Promotion of Access Restrictions**

SEPP 14 legislation protects the core wetland habitats in the main arm of the Tweed River, and important habitats on Terranora and Cobaki Broadwaters are protected by their inaccessibility. Maritime has restricted the use of power boats in a number of highly sensitive wetland areas of the estuary. It also discourages any improvements in boating access, for example the dredging of navigation channels, which would encourage any increase in boating activity in all habitat sensitive areas.

◆ **Protection of Seagrasses**

Increased boating, if not managed appropriately, can have damaging impacts on the river's seagrasses and wetland vegetation. Seagrass beds provide food and shelter for a wide variety of fish and invertebrates. Many popular angling species use seagrasses as their nursery, before moving to other habitats as they grow. Seagrasses also help bind the riverbed and improve water quality.

To help preserve seagrasses Maritime works closely with NSW Fisheries. Boaters are educated to comply with the NSW Fisheries 'Fish Habitat Protection Plan No.2: Seagrasses'. Of particular importance to boating and related activities are the following key provisions:

- vessel operators should avoid driving their boat across shallow, weedy areas, as boat propellers act like harvesters on seagrass;
- vessel operators should avoid anchoring on seagrass beds, as anchors can dislodge seagrass plants.

Moorings can damage seagrass beds and, where damage is likely, a permit is required from NSW Fisheries. Maritime will generally not approve any moorings over seagrass beds. During the life of this plan Maritime is working with NSW Fisheries to develop seagrass-friendly moorings.

◆ **Environmental Planning and Assessment Act 1979**

Environmental protection is also a key consideration in relation to any works undertaken or approved by NSW Maritime (eg. aquatic licence applications, and applications for mooring licences). Part 5 of the Environmental Planning and Assessment Act 1979 requires an assessment of the likely impacts of such proposals. The assessment guidelines require the consideration of public and environmental benefits, both present and future.

6.2.3 Action Plan:

Action	Time Frame
<ul style="list-style-type: none"> ◆ Maritime will continue working on the development of seagrass-friendly mooring systems. ◆ Tweed Shire Council advises they will continue monitoring river health with an additional focus on potential impacts from boating activity 	Ongoing
Specific actions aimed at reducing the impact of boating on riverine and riparian vegetation are detailed in the relevant management sections.	Refer relevant Management Sections

6.3 Pursuit of Activities in a Safe and Equitable Manner

The river is viewed as the “jewel in the crown” of the Tweed Shire. It is valued for the diversity of opportunities it provides the community, both commercially and recreationally.

6.3.1 Issue:

Most stakeholder groups cited the desirability of pursuing recreational (active or passive) or commercial activities without conflict, and were concerned that increased river traffic could potentially impact on user equity and aggravate user conflict.

Stakeholders also expressed safety concerns stemming from the major traffic bridges that cross the Tweed Estuary.

6.3.2 Management Strategies:

Unfortunately the active and passive uses of the river are not always compatible. This Boating Plan endeavours to ensure the best outcome for all river users while also addressing the needs of foreshore residents, whose amenity is at times compromised.

Safe navigation throughout the Estuary is of extreme value to the boating community. It is essential that, through an education program, boaters are made aware of any hazards to navigation and that NSW Maritime undertake initiatives to minimise the likelihood of incidents occurring on the waterway.

The safe passage into the Tweed River has been significantly improved following the establishment of the sand bypass system, however the Tweed Bar still presents as a navigation hazard for boaters. Statewide there have been 63 recorded boating incidents and six deaths at ocean bars since 1 January 2000, with most incidents having occurred at Tweed Heads.

Stakeholders expressed concern over a number of equity issues ranging from conflicts between skiers, rowers, and power boats in the Condong to Murwillumbah area, to the local fishing industry highlighting the negative impact that houseboats at anchor are having on their livelihood. Submissions were also received by a number of foreshore residents stressing the negative impact personal water craft, skiers and noisy power boats were having on their amenity.

Equity issues may impact on human comfort and commercial livelihoods and the following management strategies endeavour to achieve a balance between regulation and enforcement on the one hand, and awareness and education on the other, with safety as Maritime's focus.

◆ ***Location Specific Strategies:***

As reported in Table 7 (Vessel Activity by Management Section), river traffic is not spread evenly over all reaches of the river. More heavily trafficked areas include Tumbulgum; Barney's Point Bridge to Tweed Broadwater; and Condong to Murwillumbah. These sections of the river present both safety and equity issues due to the diverse activities occurring concurrently on the river. Strategies aimed at better managing these high traffic areas are detailed in the specific management sections.

◆ ***Implementation of management strategies to protect the amenity of riverside residents in urban precincts***

This initiative is in-line with the objectives of the Protection of the Environment Operations (POEO) Act 1997 and the Protection of the Environment Operations (Noise Control) Regulation 2000.

- ***Decibel Limit:***

The POEO Act 1997 and the Protection of the Environment Operations (Noise Control) Regulation 2000 are the primary legislation for the control of noise pollution on NSW waterways. The principal factor under noise legislation is the concept of "offensive noise".

Submissions from riverside residents in a number of areas consider noise emanation from vessels to be offensive and unacceptable. In-line with the principals of the above legislation NSW Maritime will introduce a 75dB(A) noise restriction in selected areas where riverside residents reside close to a narrow section of the estuary, eg. Tumbulgum Village and Murwillumbah.

The 75dB(A) noise restriction will be measured in accordance with the Authority's noise testing procedures and will be measured at 30 metres.

- ***Time curfew:***

In-line with the principals of the above legislation NSW Maritime will introduce a restriction (in selected areas) on all boating activity that lends itself to repeat passes in a confined area eg skiing, wakeboarding and aquaplaning. This curfew will be from sunset to 8:00am NSW time.

This restriction does not however preclude residents from accessing the water from their backyard, motoring a short distance to an unrestricted area, undertaking their desired towing activity and then returning to the curfew area to continue their activity after 8:00am.

The actions aligned to the above strategies are detailed in management sections B004AH, B004AI and B004AJ. Refer to **Appendix A "Stakeholders' Submissions Matrix – NSW Maritime's Response", point 13** for further information in relation to the 75dB(A) limit and associated measuring protocols.

◆ ***Codes of Conduct***

The increase in vessel activity combined with the diversity of recreational and commercial vessels on the Tweed Estuary requires specific management strategies to ensure safe and equitable use of the waterway.

Through the life of this plan NSW Maritime, in partnership with a variety of stakeholder groups, will promote the development of Codes of Conduct for location specific issues or for specific activities. These Codes of Conduct will indicate a responsible approach to overcoming potential situations that exhibit an inherent risk to safe and equitable use of the Tweed Estuary.

◆ ***Implementation of Random Breath Testing***

The NSW Government has adopted the recommendation of the Alcohol Summit to enable random breath testing to be carried out on NSW waterways. This initiative received Royal Assent on 10 March 2005 with the proclamation occurring on the 29 April 2005.

The Marine Safety Amendment (Random Breath Testing) Act 2005 amends the Marine Safety Act to do the following:

- enable random breath testing by Police Officers of persons operating vessels,
- prohibit persons under 18 years from operating vessels with any alcohol in their blood, and

- increase penalties for offences under the Act for Prescribed Concentration of Alcohol offences to be in line with similar offences under the Road Transport (Safety and Traffic Management) Act 1990.

◆ **Recognised Fishing Grounds**

NSW Maritime is sensitive to the professional fishermen's issues with regard to vessels mooring in designated meshing or hauling grounds. However at the time of preparing this boating plan there were no recognised fishing grounds (RFGs) gazetted in the Tweed Estuary. A recognised fishing ground (as designated under the Fisheries Management Act 1994) means "any area of the sea or of other public water land used regularly or intermittently for net fishing by commercial fishers, being an area identified by or in accordance with the regulations as a recognised fishing ground". Once designated a recognised fishing ground, a commercial fisher may "request a person to remove anything which has been placed or left by the person, without lawful excuse, and which is obstructing the lawful net fishing activities of the commercial fisher".

Maritime is aware that the Tweed River Professional Fishermen have made a formal submission to NSW Fisheries for the current designated mesh or hauling grounds to be given RFG status under the Fisheries Management Act 1994. Once gazetted, Maritime will undertake an education program, in conjunction with NSW Fisheries and the commercial houseboat and charter industries, to ensure that, as far as possible, non-fishing vessels, in particular the larger houseboat and charter vessels, do not impede the livelihood of professional fishermen by mooring in these areas.

◆ **Traffic Bridges**

Traffic bridges crossing navigable waters pose a series of risks for boaters. They impede navigation, represent safety concerns in terms of people fishing, swimming or diving in the waters under and surrounding the bridge, and are potentially dangerous for boaters involved in towing activities.

There are seven major traffic bridges that span the Tweed Estuary:

- Boyds Bay Bridge - Height 7.6 metres
- Tweed Heads Bypass Bridge – Height 6.1 metres
- Cobaki Bridge – Height 3.8 metres
- Barneys Point Bridge – Height 11.0 metres
- Tumbulgum Bridge – Height 7.5 metres
- Condong Bridge – Height 4.8 metres
- Murwillumbah Bridge – Height 4.8 metres

(NOTE: Heights shown are above mean high water springs [M.H.W.S.] and represent the minimum clearance in normal conditions. Significantly reduced clearance should be anticipated during floods or storm surges).

The strategies adopted in this boating plan are aimed at mitigating the risk of vessel incidents, accidents and potential serious injury for boaters navigating under these bridges and include the:

- Installation of navigation lights.
- Upgrade of existing warning signage.
- Designation, where deemed necessary, of spans for each-way vessel traffic. (See relevant management sections).
- Enforcement of *Water Traffic Regulations, Part 2 Clause 6 sub-clause (4), and Part 3 Clause 15 Sub-clause (3)*.
 - **Part 2 Clause 6 sub-clause (4)** “No Skiing or Aquaplaning Under Bridge” regulations. A person shall be guilty of an offence against this regulation if he “*navigates on any navigable waters a vessel (other than a personal watercraft) which is towing a water skier or aquaplaner so that either the vessel or the person being towed is within 30 metres from any vessel which is not engaged in water skiing or aquaplaning activities, any pile or structure*”
 - **Part 3 Clause 15 Sub-clause (3)** – A person shall be guilty of an offence under this regulation if he “*navigates a vessel (other than a personal watercraft) at a speed of or exceeding 10 knots on any navigable waters within 30 m from any vessel or any pile or structure ...*”

Note: Similar provisions apply to personal watercraft.

◆ **Education**

- NSW Maritime acknowledges that the majority of recreational boaters on the Tweed reside north of the border, and will therefore endeavour to ensure, in partnership with Maritime Safety Queensland, that all education campaigns run by Maritime reach boaters in SEQ. This may require seminars to be based in areas north of the border in order to accommodate the significant number of boaters that reside in the lower half of the Gold Coast City Council area.
- As 81% of all personal water craft on the Tweed are registered in QLD, it is imperative from a safety point of view, that the operators of these craft are familiar with NSW legislation. Maritime will target a number of education campaigns towards QLD PWC users aimed at improving compliance with NSW regulations.
- Maritime will also undertake an education and compliance campaign aimed at reinforcing that part of the legislation which states that there is to be no mooring/anchoring of vessels in identified navigation channels. Along with obvious safety concerns, vessels moored in navigation channels obstruct river traffic and impact significantly on available channel area. In high traffic areas, such as Tumbulgum,

houseboats will be allocated a designated mooring area aimed at avoiding the more congested section of the river, thereby improving the safety of all.

- As part of the education campaign Maritime will provide, in consultation with the commercial houseboat industry, pamphlets/fliers for placement in Hire & Drive vessels stressing the busy nature of the Tweed Estuary and promoting its safe and equitable use. The flier, inter alia, will:
 - indicate the busier reaches of the river and promote safe mooring areas away from these areas;
 - reinforce the legislation with regard to mooring in navigation channel areas;
 - indicate areas that may be potentially hazardous to navigation; and
 - promote the mooring of vessels outside gazetted RFGs.

6.3.3 Action Plan:

Action	Time Frame
◆ Develop Codes of Conduct with appropriate stakeholder groups	Long Term
◆ Liase with NSW Fisheries concerning areas proposed for gazettal as Recognised Fishing Grounds.	Medium Term
◆ Develop and distribute education pamphlets/fliers to be installed in all hire and drive vessels, in partnership with the industry.	Medium Term
◆ Ensure, in association with Maritime Safety Queensland, that education campaigns in this area of the State are extended to target those boaters from the lower half of the Gold Coast City Council area.	Medium Term
◆ Enforce existing "distance-off" regulations for boaters traversing under traffic bridges.	Ongoing
◆ Install navigation lighting on all bridges.	Medium Term
◆ Install "Slow down under bridge" signage.	Medium Term
Identify and mark only one span as the navigation channel.	Medium Term

6.4 Protection and Rehabilitation of the Riverbanks

The banks and foreshores are focal points for activity on the Tweed. A significant number of stakeholder groups value them for the enjoyment of recreational pursuits, to provide access to the river for on-water activities and as a passive amenity for residents and visitors alike.

6.4.1 Issue:

Many stakeholders expressed concern over the impact on the river banks of waves generated by boats. In particular, they identified wakeboarding and wakeboarding vessels, especially those with extra ballast, as being a major contributor to erosion. The costs of erosion were viewed in terms of the river's ecology and the undermining of foreshore properties.

In addition, ecologically sensitive marine and riparian flora and fauna inhabit significant sections of the river and the protection of their habitat from erosion is a major concern for many.

6.4.2 Management Strategies:

◆ *Background*

Research undertaken during the development of this plan uncovered a range of views concerning the impact vessel wake has on bank erosion and the extent of erosion occurring on the banks of the Tweed. The following gives a brief summary of the most prominent of these views:

- **The Healthy Rivers Commission**

The report "Securing Healthy Coastal Rivers" prepared by the Healthy Rivers Commission (2000) concluded that it is not possible to quantify with any certainty the extent to which boat wash contributes to bank erosion, due to the confounding effects of wind waves and flood damage. The Commission also concluded however, that action to mitigate the impacts of boat wash in areas with a high level of boating activity and unstable river banks and/or vulnerable seagrass beds is warranted.

- **Tweed River Estuary Bank Management Plan**

Produced by Patterson Britton & Partners (PBP) 1998 the Tweed River Estuary Bank Management Plan highlighted sections along the river that have been affected by erosion, and classified areas as having low, medium or high erosion potential. The plan also recommended and prioritised remedial action that needed to be taken. PBP stated that the factors contributing to river bank erosion on the Tweed River Estuary included:

- Altered flow patterns due to natural changes and human activities;
- Tidal currents;

- Flood velocities;
- Wind and boat waves; and
- Saturated bank soils."

- **The Tweed Estuary Management Plan**

The Tweed Estuary Management Plan also proposed bank protection on the Tweed but especially the section between Barney's Point and Murwillumbah. It stated that this stretch of the river was the least protected and was likely to be aggravated most by increased boating activity.

- **Australian Maritime College – Vessel Impacts on Bank Erosion on the Noosa and Brisbane Rivers**

This report stated that the varying conditions that can be found within and between river systems are such that "an over-arching methodology for determining erosion from vessel wash for any shoreline type simply does not exist." It concluded, however, that under certain conditions "vessel wash is the mechanism causing erosion along the river, though land-use issues are compounding its influence." In addition, the greater the size and speed of vessels, especially displacement and semi-planing hull-types, the greater the wave energy produced.

- **Other Studies (See Bibliography)**

The following includes a number of points that were common in a wide range of studies:

- While boating contributes to bank erosion it ranks low compared to flooding, wind wave action, structure and composition of banks, and human activity such as agriculture.
- While all erosion is a concern it predominantly occurs on the outer bends of rivers especially during flood conditions.
- Erosion from vessel wake contributes more to bank erosion when the structure and composition of banks are considered to have high erosion potential e.g. on bends; loose soil composition; and areas with no natural protection such as trees.
- When vessels plane, the wake waves produced are lower and have less energy than those of semi-planing or displacement hulled vessels.
- Larger, displacement and/or semi-planing vessels operating at speeds between 6 and 20 knots produce waves with the highest potential to erode riverbanks.
- Water-skiing vessels and PWC, to be effective, operate best while planing.
- Water-skiing vessels produce large and more intense wake when conducting power turns e.g. when returning to pick-up fallen skiers.
- The combination of high erosion potential and heavy semi-planing vessel traffic has the biggest impact on banks.
- The further a craft is from shore the less impact its waves will have.

In summary, the causes of bank erosion include flooding, wind-wave action, human activities, bank susceptibility, vessel traffic and the size and speed of vessels.

◆ **Identified Strategies**

NSW Maritime, in its partnership approach to environmental management, will implement the following strategies in an effort to minimise the impact of vessel wash on riverbanks on the Tweed:

- In accordance with the Tweed Estuary Management Plan, introduce “Minimal Wash” zones in areas identified as having high erosion potential. A vessel being operated in a Minimal Wash zone must not be permitted to create a level of wash that may impact adversely on the safety, environmental, equity or amenity values of the river or on other river users. A failure to comply may constitute a breach of Clause 5 of the Water Traffic Regulations NSW which provides that it is an offence for a vessel to be used in a way that will ‘..... *cause any annoyance, nuisance or danger to any person or danger to any property* and a court imposed penalty of up to \$1,500.00 applies.

It is also an offence not to comply with Minimal Wash signs under Clause 18 of the Management of Waters & Waterside Lands Regulations NSW and that a maximum Court imposed penalty of up to \$1,500.00 applies.

- In partnership with relevant stakeholders, procure and install aquamarks with distance-off signage at appropriate distances from bank areas identified as having high erosion potential.
- Patrol and enforce compliance to existing distance-off regulations in an attempt to mitigate potential erosion from vessel traffic in high erosion potential areas.
- Undertake an education program aimed at reducing the incidence of erosion producing vessel waves caused by such actions as power turning.
- Suggest that Tweed Council be encouraged to identify sites and put in place monitoring mechanisms such as aerial photo or survey points. In partnership with the Tweed Council, monitor and review river bank health during the life of this plan and where necessary realign existing strategies.
- In association with the Tweed River Committee, government agencies and Council, create the position of “Tweed Riverkeeper” to, inter alia, coordinate various Government and community efforts to protect and rehabilitate the banks of the Tweed.

6.4.3 Action Plan:

The actions aligned to the above management strategies are detailed in the relevant management sections.

6.5 Provision of Infrastructure

All stakeholders value the provision of appropriate infrastructure to support the sustainable use of the River by all users.

6.5.1 Issue:

The public submissions, however, reflected conflicting views on the meaning of the terms “appropriate” and “sustainable”. In addition to calls for more and improved shore-based facilities such as toilets, pump-outs, ramps and carparking, several submissions argue that additional facilities, excluding navigation aids, will invite more traffic to the river and thus impact negatively on the environmental sustainability of the river.

6.5.2 Management Strategies:

◆ *Navigation Aids*

Among Maritime’s prime statutory responsibilities is the achievement of the highest possible standards for the safety of commercial and recreational vessels and other users of NSW navigable waters. A major contributor in meeting this responsibility is the provision of aids to navigation on each of the state’s navigable waters. Nav aids as they are commonly known are the road signs and traffic lights of waterways. They include buoys and beacons for marking channels, signage announcing special conditions and restrictions, and navigational lighting marking dangerous water and safe boating zones.

NSW Maritime in 2004 had a total of \$5.1m worth of nav aids across the state and spent \$1.425m as part of its regular maintenance program. During the 2003-2004 Financial year capital expenditure on navigation aids totalled \$488,733. Nineteen new lights were installed with a further 23 upgraded during the year, including navigation lights on the Tweed. The Tweed Estuary has a total of 65 nav aids of various type, of which 47 are buoys marking channels etc. There are 21 navigational lights and approximately 90 signs indicating such restrictions as 4 knot zones, No Wash areas, and cautions for shallow water.

During May 2004, NSW Maritime (then Waterways Authority) and the Department of Lands jointly received an additional four former Australian Maritime Safety Authority lighthouses under the 1997 Heads of Agreement between the Commonwealth and State. NSW Maritime now jointly maintains a total of 14 lighthouses in NSW including Point Danger and Fingal Head.

Maritime uses both the technical expertise and experience of its on-water staff as well as data gleaned from its management systems and feedback from the community when reviewing nav aid requirements. The existing configuration on the Tweed Estuary has evolved over the past decade from monitoring boating activity, changing river conditions, and feedback from the boating community.

During the life of this plan NSW Maritime will:

- Review the existing configuration of navigation aids on the estuary and where necessary replace and/or install new marks. These changes will be prioritised and made within budgetary constraints;
- Install kilometre signs at regular intervals along the main river indicating distance from the river mouth;
- Number all navigation aids and update maps accordingly.

◆ **Mooring Management**

The following options are available to the public for the mooring of vessels:

- Vessels may be attached to private pontoons, jetties or other structures under licence from Department of Lands or Tweed Shire Council and subject to consent conditions constructed under Tweed Shire Council licence.
- Vessels may be anchored – the vessel must display an anchor light at night. (This is a temporary arrangement whilst in the course of a voyage).
- Vessels owners may be issued with an Occupation Licence (commonly referred to as a private or commercial mooring licence) – these licences are issued under the Maritime Services Act 1935 and grant approval for a vessel to occupy navigable waters, subject to conditions.

During the life of this plan, NSW Maritime will prepare a mooring management plan for the Tweed Estuary as an addendum to this boating plan. This plan will consider demand after the completion of the new Southern Boatharbour Marina and any outcomes concerning the proposed marina at Chinderah.

The mooring management plan will provide moorings for the boating community and estimate projected demand for moorings in the Tweed Estuary. The plan will ensure that:

- mooring placement is sympathetic to NSW Fisheries Habitat Management Plans and is not a threat to seagrass beds or mangroves;
- moorings do not significantly impact on recognised fishing grounds;
- appropriate waste management procedures for moored vessels are in place;
- mooring areas are developed in an ecologically sustainable manner; and
- installation and maintenance of moorings comply with approved standards.

(NOTE: In addition to "moorings" as used in this context, vessels may be berthed at a marina).

◆ **Wharves, Jetties and Boat Ramps**

NSW Maritime, while not responsible for the establishment and management of wharves, jetties and boat ramps, provides grant funding for infrastructure projects throughout NSW that benefit the boating community. Under its Asset Development and Management Program

(WADAMP) projects are initiated by a proponent such as the Tweed Shire Council or community groups, who normally provide 50% of the overall funding of each project. Since 1998/99 grant funding to the total of \$397,112 has been provided to the Tweed Shire Council for nine recreational boating projects. Six projects have been completed, including the redevelopment of the Heritage Wharf at Murwillumbah, and three further projects are in the planning, approval and tender stage.



◆ ***Boat Ramp Usage***

The Lower Tweed Boating Study concluded that the peak daily demand for boats was limited largely by insufficient parking at boat ramps. It also stated that a significant proportion of future increased boating demand could be serviced by both upgrading of main ramps, including the provision of sufficient parking, as well as constructing several new ramps in key locations.

NSW Maritime conducted a survey of public boat ramp usage over the January 2004 period with the findings summarised below.

Boat Ramp	Available Parking		Average No. of Trailers	Turnover Rate
	Formal*	Informal#		
Kennedy Drive	14	0	38	89.7%
New Fingal Boat Ramp	64	0	54	51.7%
Dry Dock Road	5	2	24	64.3%
Tumbulgum	0	0	27	75.0%
Commercial Rd Murwillumbah	0	6-8	6	50.0%
Chinderah	0	20	22	62.2%
Lakes Drive	0	4	1	100.0%
Condong Boat Ramp	0	10-15	1	100.0%
Condong Regional Facility	0	10-20	2	50.0%
Condong - back of "Liquorland"	0	5-10	0	0.0%
Chinderah - Opposite café	0	0	4	20.2%
Old Fingal Boatharbour	0	10-15	8	42.7%

Table 9

* **Formal** parking refers to the availability of a clearly designated car and trailer parking area marked by white lines, such as that found at both Kennedy Drive and the New Fingal Head Boatharbour.

Informal parking can be described as off-street parking that has no clearly dedicated and/or marked area specifically designated for cars with trailers, such as the off-street parking area at the Commercial Road ramp facility at Murwillumbah and at Lakes Drive boat ramp.

Findings:

- Total available parking was between 150 and 177 formal and informal spaces. Total average number of trailers over the weekend was 187, suggesting that demand only slightly outweighs supply.
- However, 88% of cars/trailers were parked at only 5 of the 12 ramps surveyed. Three of these were heavily over subscribed – Kennedy Drive with 38 trailers and 14 spaces, Dry Dock Road with 24 and 7, and Tumbulgum 27 and no dedicated spaces.
- 64% of all trailers were registered in Queensland. While the Lower Tweed Boating Study suggested that in 1997 Queenslanders mainly frequented ramps on the northern side of the river such as Kennedy Drive, in 2004 they were equally represented at all ramps.
- The Lower Tweed Boating Study stated that peak boating demand is dictated by the capacity of current facilities. However, the large number of cars/trailers parked outside dedicated ramp parking areas, such as in surrounding streets, would suggest there is little correlation between demand and capacity. For example, there is no dedicated parking for the Tumbulgum ramp yet an average of 27 trailers were identified in surrounding streets and on grassed bank areas over the Australia Day Weekend. Simply, parking and ramp size do not appear to be factors for boaters when selecting an area in which to launch their boat.

◆ **Boat Ramps – Conclusion**

There is a wide variety of usage patterns for boat ramps along the estuary. As already seen 88% of all cars/trailers were found at only 5 boat ramps. Conversely, some ramps were almost totally ignored by boaters.

The upper estuary is more popular with boaters pursuing towing activities, especially, Tumbulgum, Condong and Murwillumbah areas. Tumbulgum was the most frequented of these ramps yet has no formal or informal parking available at the ramp. Twenty four cars/trailers were on average located along Riverside Drive, on the grassy foreshore and in surrounding residential streets. Boaters used the ramp to launch their vessels then cruise to their “base” at various intervals along the grassy foreshore.

They clearly enjoy the “base” being within close proximity to their vessel’s picking up and setting down area as well as facilities such as shops and the local tavern. While this contributes to erosion issues which will be addressed later in the plan, boaters have a clear preference for this type of locality.

Good ramps with parking were available, for example, at Condong, yet were poorly patronised. This stretch of river has significantly higher banks than at Tumbulgum and there are no adequate picking up and setting down points in close proximity to shady, picnic type areas. Furthermore, there are no other facilities such as shops and toilets.

Ramps at Kennedy Drive, Dry Dock and Chinderah were positive proof that formal parking is not a prime consideration in selecting boat ramps. All three were heavily patronised with trailers parked wherever space was available extending into surrounding streets.

It could be concluded that ramp preference is more related to any or a combination of location, activity, facilities and amenity, than the availability of formal parking.

6.5.3 Action Plan:

In the interest of an integrated approach to river management Maritime will contact Tweed Shire Council in the short term with the following recommendation:

- That before progressing with the new regional boating facility at Condong, the Council defines those characteristics valued most by boaters when selecting ramps. For example, as the Upper Tweed is valued by vessels involved in towing, and in an effort to relieve congestion at Tumbulgum, more consideration should be given to the provision of extensive sandy picking up and setting down points within close proximity to shady, picnic type areas and services.

6.6 Safe Navigation

The boating community values the ability to transit the river without the risk of grounding.

6.6.1 Issue:

Stakeholders' concerns focussed on the need to maintain safe navigable channels due to the ever-changing conditions of the river.

6.6.2 Management Strategies:

Whilst NSW Maritime acknowledges its responsibility to ensure the safe operation of recreational and commercial vessels it does not, at this time, have a statutory obligation to dredge in areas not vested in it, except to facilitate the use of those waters by trading vessels, once it has obtained the approval of the body in whom those waters are vested.

Dredging is currently a shared responsibility that sits with the NSW Maritime, Department of Infrastructure Planning and Natural Resources (DIPNR), Council and the Department of Lands, depending on the area of water in question. It must be remembered that pursuant to the common law and the Civil Liability Act 2002, government agencies are only required to do what is reasonable to ensure public safety. This means that in some instances the erection of warning signs and/or installation of navigation aids to show a safe passage through a silted area will be sufficient to discharge a statutory responsibility to ensure safe navigation, rather than the dredging of that area.

The Independent Inquiry into the North Coast Rivers 2003 (HRC) reported on the considerable community and council pressure to dredge the Tweed estuary, in the belief that this dredging is required to:

- mitigate flooding, improve flushing and therefore water quality;
- provide construction material or fill; or
- improve navigability, both within the lower estuary and over the entrance bar.

These advantages however, are countered by those who believe that dredging may cause significant ecological damage to the river, in terms of habitat destruction.

NSW Maritime's role in this area is to consult with, and offer advice to, the lead agencies with a view to maintaining, and improving where necessary, safe and navigable channels to meet the needs of boaters on the Tweed. Maritime identifies the safest navigable configuration of the river and when changes occur, for example due to flooding or constant shoaling, advises DIPNR, Department of Lands and Council.

NSW Maritime has a major responsibility is to ensure the provision and maintenance of navigational aids for marking channels and as such will provide advice to Tweed Shire Council and the Tweed River Committee on navigational issues in the Tweed River.

The challenge clearly is to provide for safe boating while also maintaining river and estuary health.

6.7 Effective Boating Management of the River

Stakeholders value the effective management of the Tweed Estuary and recognise that this can only be achieved through the provision of adequate resources.

6.7.1 Issue:

The following expresses the concerns of the majority of stakeholders:

“It is imperative that the Boating Plan is supported by enough funding so that Maritime is able to promote safety on the water and that there are education and compliance programs. There should also be enough funding so that there are enough officers to make these programs effective.”

6.7.2 Management Strategies:

NSW Maritime has one permanent full-time BSO and one permanent part-time CSO located in the Tweed Heads operational area. During the peak boating periods (Easter Long Weekend, October – February) additional BSO resources are transferred into the area to assist with boater compliance, and the Customer Service Centre operates on a full-time basis in December and January.

NSW Maritime will endeavour to supplement these resources with a “Riverkeeper” position. The Tweed Riverkeeper would be a jointly funded position between NSW Maritime and other relevant State and Local Government agencies, with the position aimed at providing a range of customer services that specifically relate to environmental issues on behalf of both the State Government and the Tweed Shire Council. If agreement is reached to appoint a Riverkeeper, the cost of this position will be absorbed into the budgets of participating agencies. (The State’s first Riverkeeper was appointed by NSW Maritime and Sutherland Shire Council in November 1999).

Maritime adopts a shared responsibility for the natural environment, and in-line with the Intergovernmental Agreement of the Environment views the Riverkeeper position as an excellent example of State and Local Government working together to protect the environment and ensure safe and responsible use of the State’s waterways.

In addition to assisting the BSO with safety compliance work, the Riverkeeper position would be heavily focussed toward environmental compliance, and would be responsible for identifying gaps in community awareness and providing education on the appropriate use and protection of the Tweed Estuary.

6.7.3 Action Plan

Action	Time Frame
Investigate the viability of a Riverkeeper position for the Tweed and surrounding estuaries by liaising with other stakeholder agencies and the community, including the investigation of funding options.	Short Term

