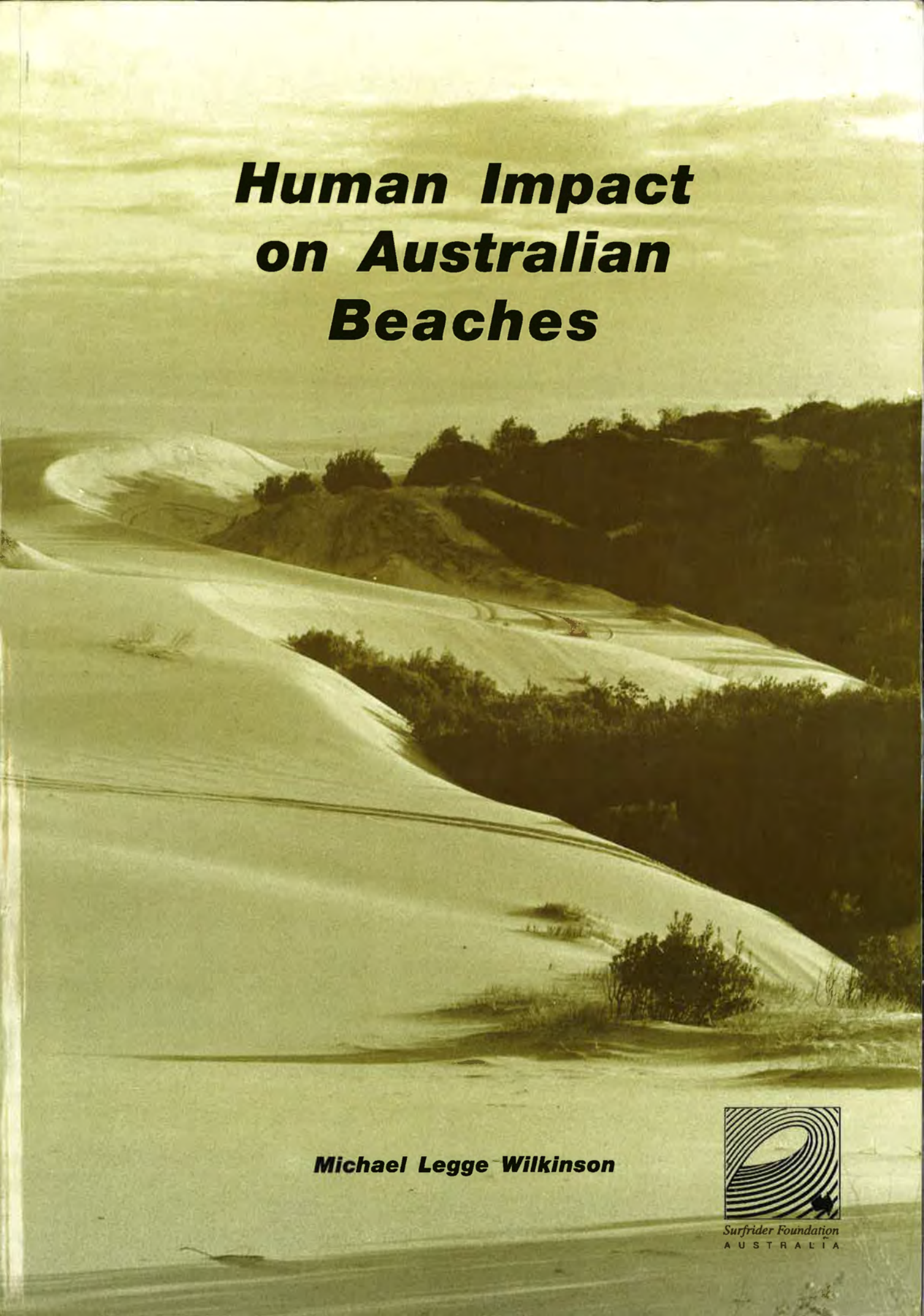
Human Impact on Australian Beaches



Michael Legge Wilkinson

Surfrider Foundation
AUSTRALIA

Human Impact on Australian Beaches

Results from the SOS95 Beach Survey

by

Michael Legge Wilkinson

Project co-ordinator / report concept and design

Michael Legge Wilkinson

Author

Michael Legge Wilkinson

Contributing writers: Tom Alletson, Michael Creary, David Nalder, Fran Stanley

Maps

Mark Moffatt

Cover - artwork and design

Bob and Mark Moffatt

Photo credits

Surfrider Foundation, Wet Paper, Marnie Kent

Survey design

Michael Legge Wilkinson, Bob Moffatt

Data processing and interpretation

Tom Alletson, Michael Creary, Kevin Dunne, Melanie Fontain, Greg Howell, Michael Legge Wilkinson, Vicki Long and Georgia McDonald

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Contents

Foreword

In founding the Surfrider Foundation of Australia in 1991, concerned surfers recognised that, whilst Australians were regarded as the greatest beach loving nation in the world, very little was being done to protect our beaches from the impacts of population growth and urban development.

We, as a country, hadn't learnt from the mistakes we'd made in the past and were continuing to destroy fragile coastal habitats and use the ocean as a sewer.

From the very beginning, Surfrider Foundation has sought to raise awareness of these and other issues. As a result, in just five short years we have grown to become one of the world's largest coastal protection organisations.

We made a commitment from the start to be a hands-on conservation organisation, leading by example. In doing so, we have established more than 58 branches Australia-wide. Each branch targets local issues and actively promotes coast care through Conservation, Activism, Research and Education (CARE).

In 1993, one of our founding members, Michael Legge Wilkinson, a keen surfer and engineering student from Newcastle, designed a questionnaire to gather data on Australian beaches.

Being an engineer, Michael recognised the need for hard data to support our primary objective to protect and enhance Australia's beach environments for the benefit of all.

With only a shoestring budget and the help of other Surfrider Foundation members from throughout Australia, Michael produced the first State of our Surf (SOS) Report which was released to a hungry media from the sands of Bondi Beach. The result was an unprecedented Australia-wide media coverage of the report and its recommendations.

This first effort gave us a taste for what can be achieved with hard data and so, with the help of a grant from the Coasts and Marine Branch of the Department of Environment Sports and Territories, we set about improving and expanding the database we had created.

Specifically we wanted answers to some pretty important questions:

- How extensive is property and infrastructure development along the Australian coastline?
- How many beaches are affected by new development proposals?

"We made a commitment from the start to be a hands-on conservation organisation, leading by example.

In doing so, we have established more than 58 branches Australia-wide."

- How many beaches have lost their dunal system to urban or infrastructure development?
- How many sewerage outfalls are discharging effluent into estuarine or marine environments?
- Where are the sewerage outfalls located and what quality effluent do they discharge?
- How many beaches are affected by stormwater discharge pipes?
- Which rivers, creeks, lakes, lagoons and harbours are sources of beach pollution via their catchment?
- Who uses the local beach and for what purpose?
- Is litter a problem, how extensive is it, what types of litter are being found and what are the sources?
- How many beaches have restricted access because of private property?
- What other issues are affecting beaches around Australia?
- Who is caring for our beach environments and how extensive is coast care?

This report provides the answers to these questions and more and gives us the first fair dinkum Australia-wide perspective.

As surfers, we are a new type of indicator species, one that can be used to judge the water quality and condition of our beach environments. We are at the end of the pipes, rivers and creeks that discharge pollutants from catchment to sea. We want to surf in an ocean free from pollution and these basic rights we want for our children's children.

Have you ever stood on a beach in autumn at the end of a particularly stressful day? The summer crowds have long since gone and in your solitude you breathe deep taking in the crisp air, relaxing with each breath.

There can be no doubt that our beaches provide us with many benefits, commercial and spiritual, and it is no wonder that most of us choose to live by the sea. We are a people clinging to the edge of our island continent, an edge that boasts one of the finest coastlines of any continent in the world.

We have a duty of care to look after and preserve our coastal environment so that we may pass on to our children's children an undiminished resource. In order to do so, we must learn from the mistakes we have made in the past. Reading this report is a good place to start. The next step is to become actively involved.

After all, it's your beach.

Respect the beach

Signed

Members of the Surfrider Foundation

Acknowledgements

As with all projects of this size and scope there are many individuals and organisations to thank.

Firstly, this project could not have proceeded without a grant from the Coasts and Marine Branch of the Department of Environment, Sports and Territories. Additional grants have been provided by WaterWise Queensland and Coastcare Australia (pending approval).

Financial support for the work of the Surfrider Foundation is provided by members and corporate sponsors.

More than 340 individuals and 70 organisations from throughout Australia helped Surfrider Foundation with the SOS95 Beach Survey. Surfrider Foundation would like to thank all of those who gave of their time freely to survey beaches in their region. A full list of network members and organisations who provided assistance is presented in Appendices 5.1 and 5.2 respectively.

Mark and Bob Moffatt of Wet Paper provided guidance and assistance at every stage in the production of this report.

Special thanks to Tom Alletson, Michael Alscher, John Clowes, Michael Creary, Kevin Dunne, Brad Farmer, Melanie Fontain, Matt Keys, Greg Hill, Greg Howell, Vicki Long, Georgia McDonald, David Nalder, Maria Simonelli and Brooke Summers for their help and support.

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Summary

During the last 20 years, population growth in the non-metropolitan coastal zone of Australia has exceeded that of the capital cities. Consequently, there is a ribbon pattern of urban development emerging in blocks and hugging the coast between Cairns and Adelaide. Similar blocks of development are emerging north and south of Perth and along parts of Tasmania. Urbanisation of the coastal fringe impacts heavily on the coastal environment.

If Australia is to achieve ecologically sustainable development in the coastal zone, it must recognise these impacts and seek, in future coastal developments, to avoid some of the mistakes that have been made in the past. Fundamental to Australia achieving this goal is community awareness of, and participation in, planning and development issues. This report, in documenting and assessing human impacts on beaches around Australia, is designed to help facilitate this process.

Data presented has been obtained via a network of volunteers using the SOS95 Beach Questionnaire. This questionnaire prompts respondents for information pertaining to the nature of adjacent land use, property development, direct and indirect pollution sources, litter, and recreational use at beach areas surveyed. The survey took place over a period of four months, commencing February1995, and targeted beaches along all but the most remote parts of the Australian coastline.

"The results indicate that approximately eight per cent of Australia's 7259 mainland beaches are in urban areas."

Survey Results

Network members returned 1612 completed surveys providing data on 1392 mainland beach areas (including Tasmania) and 220 island beach areas. The majority of surveys were for individual beaches (91 per cent), the rest covered two or more beaches in a geographic group (four per cent), or beaches along a section of coastline between two geographic points (five per cent). The mainland coverage represents approximately 20 per cent of Australia's 7259 mainland beaches.

Key statistics from the survey are:

- 526 (33 per cent) of the 1612 beach areas surveyed are in urban areas. Extrapolating on the basis that the survey covered around 90 per cent of Australia's urban beaches, the results indicate that approximately eight per cent of Australia's 7259 mainland beaches are in urban areas.

- 1157 (72 per cent) of the 1612 beach areas surveyed have property or infrastructure development within 250 metres of the high tide mark.
- 100 (six per cent) of the beach areas surveyed have lost their dunal buffer to urban development.
- There are mining operations at 38 (two per cent) of the 1612 beach areas surveyed, the majority of which are sandmines.
- There are development proposals affecting 334 (21 per cent) of the 1612 beach areas surveyed.
- Of the 334 beach areas affected by development proposals, 148 (44 per cent) involve housing development, 56 (17 per cent) involve resort development, and 34 (10 per cent) involve a marina or canal development.
- Network members identified non-native plant species at 601 (37 per cent) of the 1612 beach areas surveyed. In the majority of cases, species identified were 'common-knowledge' species like bitu bush and lantana.
- 383 (24 per cent) of the 1612 beach areas surveyed have stormwater pipes discharging to the beach and/or it's lagoon.
- Of the 383 beaches with stormwater pipes, 206 (54 per cent) had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter types evident were plastic bags, cigarette butts, and food wrappers.
- 344 (21 per cent) of the beach areas surveyed are within five kilometres of a public sewerage outfall.
- Of the 148 public sewerage outfalls identified as discharging in the vicinity of beach areas surveyed, 32 (21 per cent) are discharging primary treated effluent or worse.
- Network members identified 368 water courses as sources of beach pollution via their catchment. The most common pollution sources cited were urban runoff and agricultural runoff.
- Network members specified one or more litter categories at approximately 80 per cent of the beach areas surveyed. The most common litter types found were food wrappers, plastic bags, cans, and cigarette butts.
- Approximately 30 per cent of the 1612 beach areas surveyed have some form of dune fencing.
- Groups responsible for dune care (including shire councils and park rangers) look after approximately 35 per cent of the 1612 beach areas surveyed.

".. 24 per cent .. of the beach areas surveyed have stormwater pipes discharging to the beach and/or it's lagoon."

- There is regular litter removal by one group or another (including individuals) at approximately 40 per cent of the 1612 beach areas surveyed.
- Shire councils grade sand regularly at 110 (seven per cent) of the 1612 beach areas surveyed.
- Shire councils replenish sand intermittently at 59 (four per cent) of the 1612 beach areas surveyed.
- 105 (seven per cent) of the 1612 beach areas surveyed have one or more groynes along their length.
- There are rubbish bins at 50 per cent of the1612 beach areas surveyed. The majority of these are located in car parks and/or access paths.
- 1370 (83 per cent) of the beach areas surveyed have unrestricted public access, 150 (nine per cent) require an entry fee or permit, 103 (six per cent) are restricted in part, and 36 (two per cent) are closed to the public.

In addition to the survey overview, there are descriptive summaries of the data for each region with maps showing the names and locations of beach areas surveyed.

Recommendations

In keeping with the intent of this report, the following recommendations are designed to redress some of the problems arising from land use and development in the coastal zone. Recommendations target the three tiers of government (federal, state and local) who, as our elected representatives, have the responsiblity of managing our coastal resources.

Building Construction and Property Development

Federal

1 Develop national standards and guidelines for building construction and property development in the coastal zone.

2 Fund development of a coastal resource atlas to guide future development in the coastal zone.

3 Provide funding for land acquisition programs.

State

4 Develop long term plans to set aside areas not suitable for coastal urbanisation including land supporting vegetation associations nominated as having high conservation value and land characterised by terrain types nominated as having low capacity physically to absorb the impacts associated with urban development.

5 Establish land acquisition programs for land set aside as per 1.

Local

6 Develop adequate controls for building construction and property development in the coastal zone including provision for adequate buffers between developments and the high tide mark, on-site erosion and sediment control, stormwater mitigation and control measures, and waste-water re-use.

7 Develop long term strategic plans for managing coastal land as per 1.

Waste Water

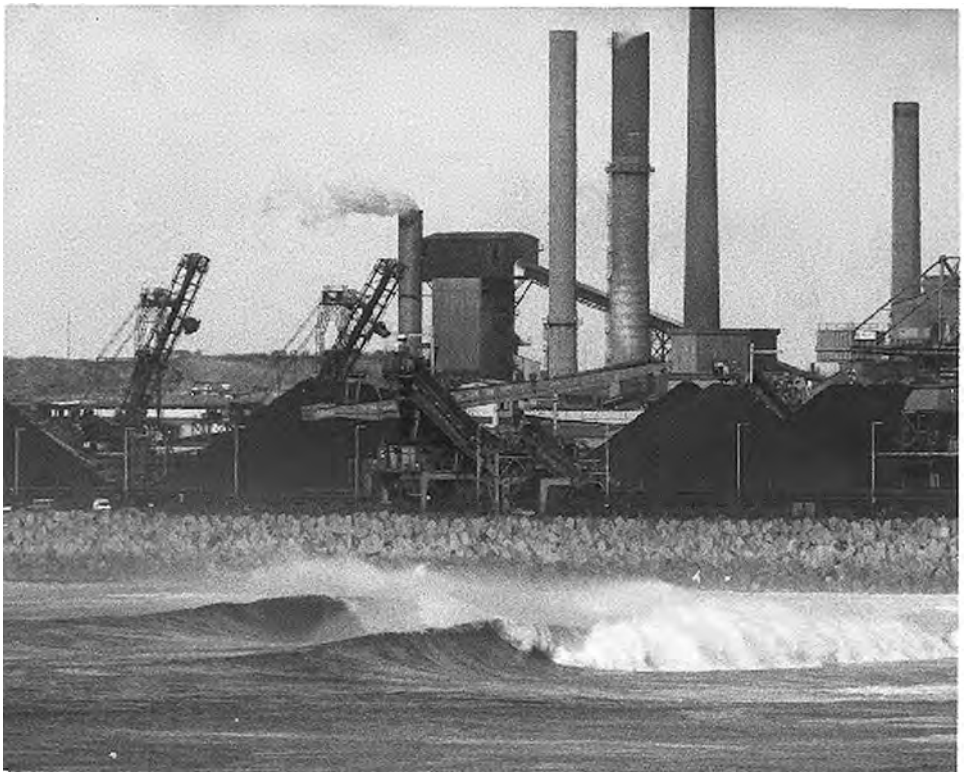
Federal

8 Develop national standards and guidelines for waste water management and effluent re-use.

Provide financial incentives to state and local governments embarking on waste water re-use programs.

State

9 Develop long term strategic plans for upgrading sewerage treatment across the board and maximising waste water re-use.



Local

10 Encourage dual reticulation in new developments.

11 Upgrade treatment and maximise waste water re-use where possible.

Catchment Management

Federal

12 Develop national standards and guidelines for stormwater management.

13 Provide financial incentives for state and local governments to embark on catchment management programs.

State

14 Develop long term strategic plans to improve catchment management including the re-establishment of adequate buffer zones of riparian vegetation around water courses.

Local

15 Facilitate community catchment management programs including a catchment management liaison officer to engender community awareness of drainage and stormwater issues.

16 Establish adequate controls for new developments incorporating on-site erosion and sediment control, stormwater mitigation and control.

Recreational Use and Litter

Federal

17 Encourage through funding greater environmental awareness amongst specific user groups including, for example, the fishing, surfing and boating communities.

18 Develop national standards and guidelines for packaging.

State

19 Develop environmental guidelines and controls for different recreational user groups.

20 Develop and implement Container Deposit Legislation to encourage recycling.

21 Develop packaging guidelines and controls, for example the banning of plastic bait bags.

22 Fund community clean-up programs.

Local

23 Develop management plans for recreational areas.

24 Encourage participation in community clean-up programs.

Coastcare

Federal and State

25 Encourage through funding community coastcare and action programs.

Local

26 Facilitate participation in community coastcare and action programs.

1. Introduction

Since colonisation in 1788, Australia's population growth and economic activity has been focused predominately in the coastal zone. As a result, approximately 86 per cent of the Australian population currently live on the coast compared with the global average of around 60 per cent[1, 2].

During the early days of colonisation, beaches were often used for travel by horse or foot as they provided an easier alternative than the heavily timbered and often rugged hinterland. This tradition of using beaches for transport continued well into the 1900s[3].

During this time, bathing was outlawed between the hours of 6am and 8pm and it was not until September 1902, when a very public display of illegal daylight bathing by the editor of the Manly and North Sydney News, William Gocher, was acquitted by the Inspector General of Police, that bathing during daylight hours became legal[3]. This event marked the beginning of a new Australian culture.

Today, Australia's beach culture is well and truly established and our preference for settling on the coast has as much to do with easy access to a sandy beach as it has to do with access to employment and resources. So much so, in fact, that during the last 20 years population growth in the non-metropolitan coastal zone has exceeded that of the capital cities[1].

This growth has had a profound effect on the way we develop and live on the coast and there is now a ribbon pattern of urban development emerging in blocks and hugging the coastline between Cairns and Adelaide. Similar blocks of development are emerging north and south of Perth and along parts of Tasmania.

Urbanisation of the coastal fringe impacts heavily on the coastal environment resulting in ecosystem disturbance and loss, declining water quality, sedimentation of estuarine and near shore ocean environments, and unsustainable use of coastal and marine resources.

These impacts conflict directly with other sustainable industries like fishing and tourism that generate billions of dollars for the Australian economy every year. The ideal then, given the demands and conflicting uses, is to manage the coastal zone in a way that ensures future generations do not inherit a diminished resource.

If Australia is to achieve ecologically sustainable development in the coastal zone, it must recognise the impacts associated with urban development and seek to avoid the mistakes that have been made in the past. Fundamental to Australia achieving this goal is community awareness of, and participation in, coastal planning and development issues. This report, in documenting the incidence of human impact on beaches around Australia, is designed to help facilitate this process.

1.1 Study Objectives

The aim of this report is to provide an overview of human impact on Australian beaches. The data presented has been obtained through the Surfrider Foundation's 1995 State of Our Surf (SOS) project, an ongoing review, launched in December 1992, that is documenting and assessing human impact on beaches around Australia. The broad objectives of this project are to:

- provide baseline data for the conservation work of Surfrider Foundation;
- empower individuals throughout Australia by directly involving them in the project;
- tap into the knowledge 'locals' have on issues and impacts affecting beaches in their region;
- raise community awareness of, and participation in, issues of coastal conservation.

1.2 Study Scope

Data Scope

This report focuses on impacts associated with land use, property development and recreation at beach areas surveyed. Specifically, data presented pertains to the following:

- nature of adjacent land use;
- property development within 250 metres of the high tide mark;
- presence of exotic and other non-native flora species;
- direct pollution sources;
- pollution sources via catchment;
- incidence of litter;
- beach management initiatives;
- public access and recreation.

Geographical Scope

The project targeted beach areas throughout Australia including the following islands: the Torres Strait group, Great Keppel, Fraser, Bribie, Moreton, North Stradbroke, South Stradbroke, Norfolk, Lord Howe, Phillip, Kangaroo, Rottnest, King and Flinders.

The extent of survey coverage varies region to region but is generally good in all but the most remote parts of the Australian coastline. Remote areas are, by definition, sparsely populated and, therefore, relatively free of impacts. Coastal areas considered remote for the purpose of this study are the Northern Territory coastline with the exception of Darwin and it's immediate environs; the Queensland coastline along the Gulf of Carpentaria and York Peninsula; the Kimberley Region of Western Australia; the Great Australian Bight between Coffin Bay and Esperance; and finally the south-west and west coasts of Tasmania.

1.3 Study Approach

Source of Data

The source of data that forms the basis of this report is a network of volunteers (network members) who provided data on beaches in their region via the SOS95 Beach Questionnaire.

Network members were selected on the basis of their already active involvement in coastcare. That is, they were either active members of Surfrider Foundation or some other 'hands on' conservation group like Landcare or Dunecare or, alternatively, worked for government authorities with an interest in coastal conservation. Network members were first contacted by telephone and then asked to cover a specific section of coastline: the job being to complete the Questionnaire for as many beaches as possible along that section. In this way a network of approximately 340 individuals was established throughout Australia with the aim of covering as many beaches as possible. In remote locations where volunteers were scarce, gaps were filled wherever possible with district rangers, fishery department representatives or council officers.

Design of the SOS95 Beach Questionnaire

The SOS95 Beach Questionnaire was designed to facilitate the collection of data pertaining to human impacts on a single beach area (see Appendix 5.3). The Questionnaire comprises a double-sided A4 page divided into 14 sections. The Questionnaire prompts respondents for ticked and descriptive responses describing: the nature of adjacent land use; types of development within 250 metres of the high tide mark; direct and diffuse pollution sources; exotic and other non-native flora; litter; beach management initiatives; public access and recreational use.

The Questionnaire does not require any level of expertise, with the exception of question 4b pertaining to the identification of non-native flora, and network

members did not receive training for this project. The Questionnaire does, however, require network members to be familiar with the beach being surveyed and, ideally, with issues of coastal conservation. The use of volunteers from community based conservation groups and government authorities was seen as the best way to meet this knowledge requirement.

With respect to question 4b pertaining to the identification of non-native flora, it was decided to include this question, despite the fact that it requires a certain level of botanical expertise, because results would provide a guide as to the level of knowledge network members have of non-native flora and help to quantify the incidence of, at the very least, common knowledge species like Bitu and Lantana.

Network members were encouraged to consult with local authorities when in doubt and, where applicable, to list their sources of information.

Survey Duration

Network members were given a period of approximately two months to complete the Questionnaire for as many beaches as possible along their nominated stretch of coastline. Because the network itself was established over a period of two months, the survey took place over a period of four months between February and June 1995.

Coverage Achieved

Out of a network of approximately 340 participants, all but three managed to submit at least some coverage of the beaches in their region. The overwhelming majority submitted coverage that exceeded expectations. The original target set at the beginning of the project was for 1200 completed surveys. By the end of the four month period, network members had returned a total of 1612 completed surveys resulting in good coverage along all but the most remote parts of the Australian coastline.

Processing and Interpreting the Data

Data from the survey was summarised using 11 separate database tables (Microsoft Works). Ticked responses were transcribed direct whilst descriptive responses were entered as text, abbreviated if necessary and, wherever possible, kept to a uniform style. Responses that were ambiguous, difficult to read, or for some other reason difficult to understand were verified with the respondent at the discretion of the author. As a general rule, owing to the time constraints of the project, verification took place only when the difficulty was perceived to significantly impair the interpretation of data for the beach concerned.

The only data category where the author sought information from a secondary source was that pertaining to sewerage outfalls in which case verification was sometimes sought from relevant state or local government authorities.

Study Limitations

Using a network to obtain information via a survey questionnaire has advantages in that it enables you to cover large areas of coastline in a relatively short amount of time. There are, however, some limitations and these must be taken into account when analysing the data.

- The quality of data received will vary as a function of an individual's expertise, interpretation, motivation and familiarity with the beach area being surveyed.
- The majority of questions pre-empt responses by defining categories to be ticked thereby leaving the way open for respondents to tick a category even though it might not apply. This is particularly pertinant for questions 9b, 10a, and 10b which prompt respondents to specify litter categories evident at the time of survey.
- The majority of questions are set out in a generalised fashion to cater for differing circumstances and beach types. In answering these questions, respondents are forced to adapt the questionnaire to the particular, and often unique, circumstances of the beach being surveyed.

In addition, there are limitations within the data scope itself.

- The focus of the questionnaire is on the immediate beach environment thereby ignoring, with the exception of question 11, other parts of the coastal catchment. Question 11 seeks to redress this problem by asking network members to identify pollution sources reaching the beach via rivers, creeks, and other water courses. Data provided in response to this question is, however, purely anecdotal.
- The data pertains to the *incidence* of impacts and not the *effects* . For example whilst there is data on the location of stormwater pipes and sewerage outfalls, there is no data on the water quality of receiving environments.

"Using a network to obtain information has advantages in that it enables you to cover large areas of coastline in a relatively short amount of time.

There are, however, limitations and these must be taken into account when analysing the data."

Despite these limitations, the data is invaluable in that it achieves the objectives outlined in Section 1.1 and provides a framework for proceeding with further studies.

Future Efforts

Future efforts will use multi-media tools to build upon and improve the quality of data presented in this report. In addition, there will be pilot studies set up in individual coastal catchments to examine methods for identifying, quantifying and assessing human impacts on a catchment basis.

1.4 Structure of this Report

Chapter 2 presents an overview of the survey results. Each data category is discussed in turn with occasional reference to data from other sources.

Chapter 3 presents a descriptive summary of the data for each region and includes maps showing the names and locations of beach areas surveyed.

The survey data itself is presented, beach by beach, in seperate volumes which are available for each state.

Copies of this data can be obtained by contacting Surfrider Foundation c/- PO Box 1441 Dee Why 2099.

2. Survey Results

2.1 Survey Coverage

Network members returned 1612 completed surveys providing data on1392 mainland beach areas (including Tasmania) and 220 island beach areas. The majority of surveys provide data on individual beaches (91 per cent), the rest cover two or more beaches in a geographic group (four per cent), or a section of coast between two geographic points (five per cent). Tables 2.1 and 2.2 present a breakdown of the number of surveys for each mainland region and island grouping respectively.

Based on figures provided by the Australian Beach Safety and Management Program (see Box 2.1) the mainland coverage achieved by this survey represents just 20 per cent of Australia's mainland beaches. However, if you were to exclude the remote areas of northern Australia between Cape Leveque in Western Australia and Cape Tribulation in Queensland then coverage achieved by the survey is closer to 50 per cent. If, to take the argument further, you were to consider urban beaches only, than coverage exceeds 90 per cent.

Box 2.1 How many beaches does Australia have?

Surf Life Saving Australia in conjunction with the Coastal Studies Unit of the University of Sydney has, under the direction of Dr Andrew Short, been identifying and classifying beaches around Australia for the purpose of hazard identification and risk assessment[4]. This project, known as the Australian Beach Safety and Management Program, has identified, and is in the process of classifying, every one of Australia's mainland beaches. Whilst figures are still being finalised and the definitive count is not yet available there are, according to the study, approximately 7259 mainland beaches including 146 inside Port Phillip Bay. For further information on the Australian Beach Safety and Management Program contact Surf Life Saving Australia on (02) 9597 5588.

Table 2.1: Number of surveys returned for mainland regions

Region	Total Number of Surveys	Number of Surveys for: Individual Beaches	Groups of Two or More Beaches	Beaches Along a Section of Coastline	Coverage*
Northern Territory					
WA border to QLD border	8	8	-	-	Poor
Subtotal	**8**	**8**	**0**	**0**	
Queensland					
NT border to Cape Grafton	28	28	-	-	Poor
Cape Grafton to Slade Point	44	43	1	-	Reasonable
Slade Point to Baffle Creek	49	47	-	2	Reasonable
Baffle Creek to Caloundra	39	38	1	-	Good
Caloundra to NSW border	25	19	3	3	Very good
Subtotal	**185**	**175**	**5**	**5**	
New South Wales					
QLD border to Clarence River	28	14	2	12	Very good
Clarence River to Hastings River	64	60	-	4	Good
Hastings River to Port Stephens	36	33	1	2	Good
Port Stephens to Broken Bay	43	39	4	-	Excellent
Broken Bay to Bass Point	73	71	1	1	Excellent
Bass Point to Batemans Bay	57	56	-	1	Good
Batemans Bay to VIC border	59	53	5	1	Good
Subtotal	**360**	**326**	**13**	**21**	
Victoria					
NSW border to Inverloch	62	61	-	1	Reasonable
Inverloch to Barwon Heads	73	72	1	-	Good
Barwon Heads to Cape Otway	32	17	1	14	Very good
Cape Otway to SA border	29	29	-	-	Reasonable
Subtotal	**196**	**179**	**2**	**15**	
South Australia					
VIC border to the Murray Mouth	21	18	3	-	Reasonable
Murray Mouth to Port Adelaide	43	40	-	3	Good
Port Adelaide to Point Bolingbroke	73	67	3	3	Reasonable
Point Bolingbroke to WA border	48	41	3	4	Reasonable
Subtotal	**185**	**166**	**9**	**10**	

*Coverage is an estimate of the percentage of beaches in each region covered by the survey:

Excellent	Greater than 80 per cent
Very good	Between 60 and 80 per cent
Good	Between 40 and 60 per cent
Reasonable	Between 20 and 40 per cent
Poor	Less than 20 per cent

Table 2.1 (cont'd): Number of surveys returned for mainland regions

Region	Total Number of Surveys	Number of Surveys for: Individual Beaches	Groups of Two or More Beaches	Beaches Along a Section of Coastline	Coverage*
Western Australia					
SA border to Hopetoun	45	45	-	-	Reasonable
Hopetoun to Cape Leeuwin	50	48	2	-	Reasonable
Cape Leeuwin to Becher Point	54	43	1	10	Reasonable
Becher Point to Two Rocks	34	25	1	8	Very good
Two Rocks Beach to Steep Point	43	40	1	2	Good
Steep Point to Cape Keraurdren	60	57	3	-	Reasonable
Cape Keraurdren to NT border	17	17	-	-	Poor
Subtotal	**303**	**275**	**8**	**20**	
Tasmania					
Tamar River to Cape Lodi	34	31	2	1	Reasonable
Cape Lodi to Marion Bay	31	27	2	2	Reasonable
Marion Bay to South East Cape	33	33	-	-	Reasonable
South East C. to Macquarie H.	15	14	1	-	Poor
Macquarie H. to Tamar River	42	41	-	1	Reasonable
Subtotal	**155**	**146**	**5**	**4**	
Mainland Total	**1392**	**1275**	**42**	**75**	

*Coverage is an estimate of the percentage of beaches in each region covered by the survey:

Excellent	Greater than 80 per cent
Very good	Between 60 and 80 per cent
Good	Between 40 and 60 per cent
Reasonable	Between 20 and 40 per cent
Poor	Less than 20 per cent

Table 2.2: Number of surveys returned for island regions

Region	Total Number of Surveys	Number of Surveys for: Individual Beaches	Groups of Two or More Beaches	Beaches Along a Section of Coastline	Coverage*
Northern Territory					
Milingimbi Island	1	1	-	-	Poor
Sir Edward Pellew Group	1	-	1	-	Poor
Subtotal	**2**	**1**	**1**	**0**	
Queensland					
Torres Strait Group of Islands	3	1	2	-	Poor
Magnetic Island	19	19	-	-	Excellent
Whitsunday Group of Islands	4	4	-	-	Poor
South Keppel Island	17	17	-	-	Excellent
Fraser Island	14	7	-	7	Excellent
Bribie Island	6	6	-	-	Very good
Moreton Island	10	10	-	-	Very good
North Stradbroke Island	6	6		-	Good
South Stradbroke Island	1	1	-	-	Good
Subtotal	**80**	**71**	**2**	**7**	
New South Wales					
Norfolk Island	4	4	-	-	Reasonable
Lord Howe Island	9	9	-	-	Very good
Subtotal	**13**	**13**	**0**	**0**	
Victoria					
Nooramunga Barrier Is.	1	-	1	-	Good
Phillip Island	30	29	-	1	Very good
Subtotal	**31**	**29**	**1**	**1**	
South Australia					
Kangaroo Island	33	33	-	-	Very good
Subtotal	**33**	**33**	**0**	**0**	
Western Australia					
Penguin Island	1	-	1	-	Good
Rottnest Island	27	27	-	-	Excellent
Wedge Island	1	-	1	-	Good
Cocos Islands	1	-	1	-	Good
Downes Island	1	-	1	-	Good
Finucane Island	2	2	-	-	Good
Islands of the Pilbara	10	-	10	-	Good
Subtotal	**43**	**29**	**14**	**0**	

*Coverage is an estimate of the percentage of beaches in each region covered by the survey:

Excellent	Greater than 80 per cent
Very good	Between 60 and 80 per cent
Good	Between 40 and 60 per cent
Reasonable	Between 20 and 40 per cent
Poor	Less than 20 per cent

Table 2.2 (cont'd): Number of surveys returned for island regions

Region	Total Number of Surveys	Number of Surveys for: Individual Beaches	Groups of Two or More Beaches	Beaches Along a Section of Coastline	Coverage*
Tasmania					
Flinders Island	2	1	1	-	Poor
Schouten Island	2	2	-	-	Poor
Bruny Island	3	3	-	-	Poor
Robbins Island	1	-	1	-	Poor
King Island	10	10	-	-	Reasonable
Subtotal	**18**	**16**	**2**	**0**	
Island Total	**220**	**192**	**20**	**8**	

*Coverage is an estimate of the percentage of beaches in each region covered by the survey:

Excellent	Greater than 80 per cent
Very good	Between 60 and 80 per cent
Good	Between 40 and 60 per cent
Reasonable	Between 20 and 40 per cent
Poor	Less than 20 per cent

2.2 Land Use and Development

Adjacent Land Classification

Network members were asked to indicate whether adjacent land class was one or more of the following: urban, crown, private, or reserve, and if private or reserve to provide details (SOS Beach Questionnaire, Question 3).

Whilst such a simplified system has it's limitations, the intention was not to repeat the work already done in this area by presenting a breakdown of land tenure in the coastal zone (see Box 2.2). The aim was simply to provide an overview of land use immediately adjacent to beach areas surveyed.

Figures 2.2 and 2.3 present the results. Please note from Figure 2.2 that whilst 33 per cent of the beach areas surveyed are, according to network members, located in urban areas, only 26 per cent are adjacent to private property. This apparent anomoly has come about because 'urban' and 'private property' were often treated as mutually exclusive by network members: understandable given that 'urban' is an all-encompassing term that eliminates the need for further sub-classification. Further confusion arises outside of urban areas whenever there is a strip of unallocated crown land separating the beach area from private property. Some network members indicate both farming property and crown land, whilst others indicate crown land only.

Extrapolating on the basis that the survey covered 90 per cent of Australia's urban beaches, the results indicate that approximately eight per cent of Australia's 7259 mainland beaches are in urban areas. Similarly, it is possible to extrapolate for each State and Territory in the same way. Figure 2.4 presents the results.

Box 2.2 Land tenure in the coastal zone

Broadly speaking, there are two types of land class in Australia: state and freehold. State land (more popularly known as crown land) can encompass any one of a number of different land tenures for which each state has it's own regulatory system.

According to the Resource Assessment Commission's 1993 Coastal Zone Inquiry, private land (freehold or leasehold) makes up 57 per cent of land in local government administrative areas abutting the coast[1]. The remaining 43 per cent includes indigenous land (16 per cent), unallocated state (10 per cent), conservation (10 per cent), and finally, other types including state reserves, forestry, defence, and mining (eight per cent).

According to Network Members 33 per cent of the beach areas surveyed are located within urban areas

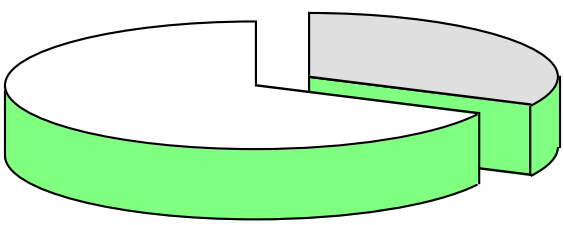
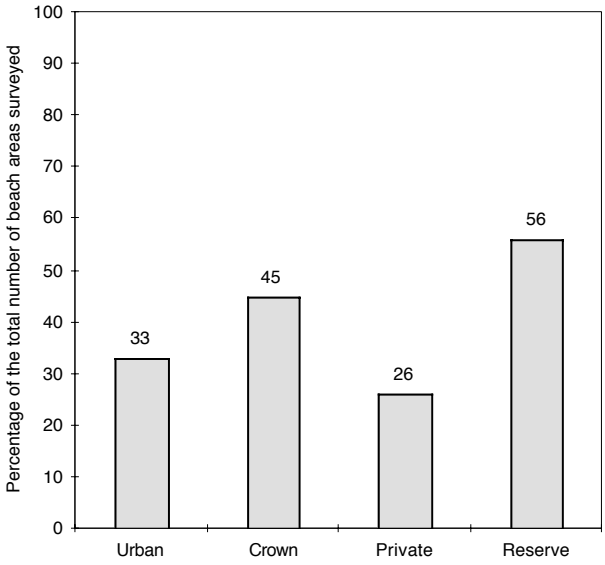


Figure 2.2: Land class immediately adjacent to beach areas surveyed as specified by Network members

a) All regions



b) State by state

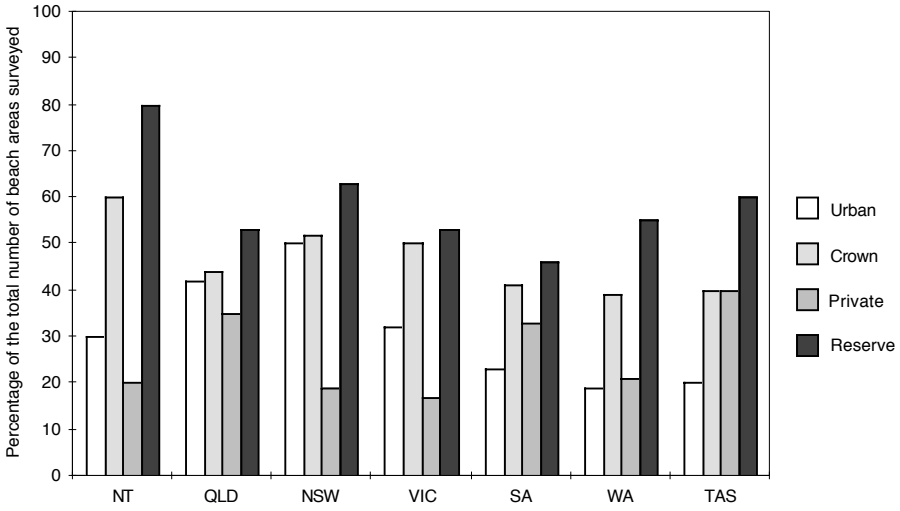
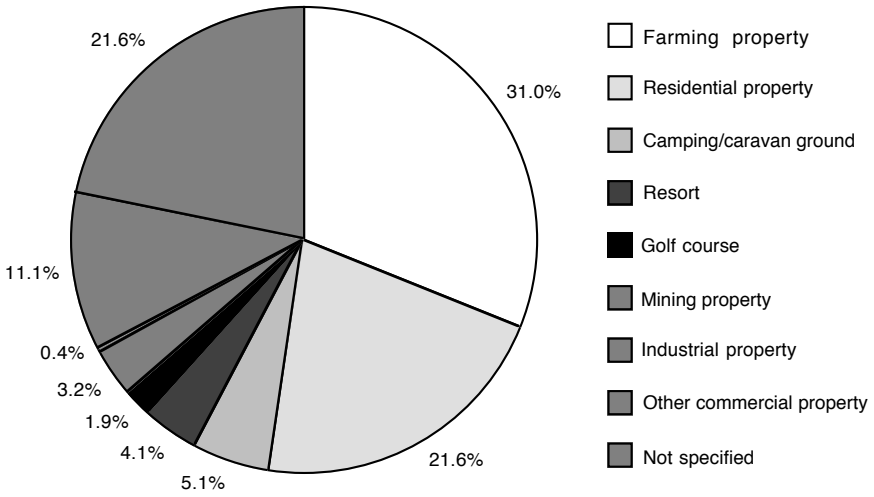


Figure 2.3: Private and reserve land categories immediately adjacent to beach areas surveyed

a) Private land categories



b) Reserve land categories

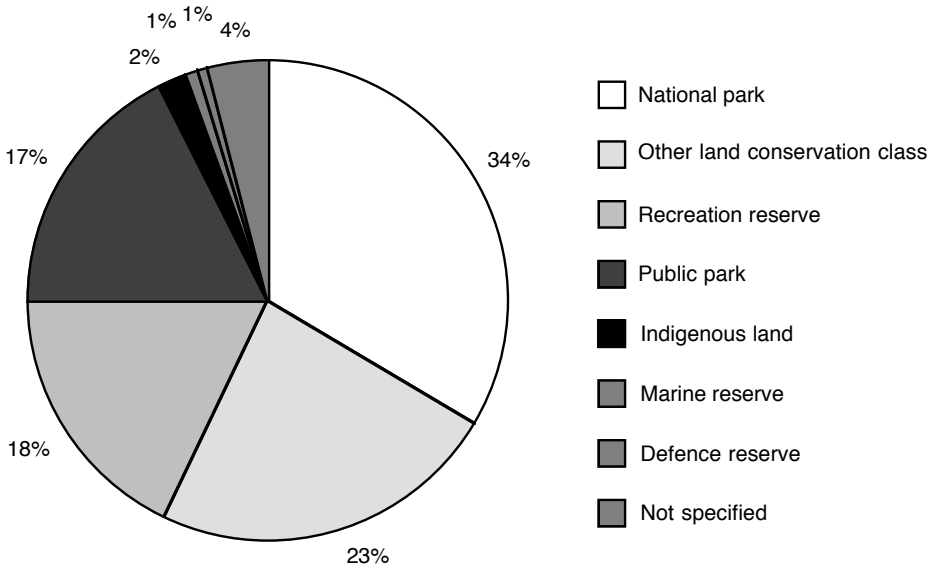
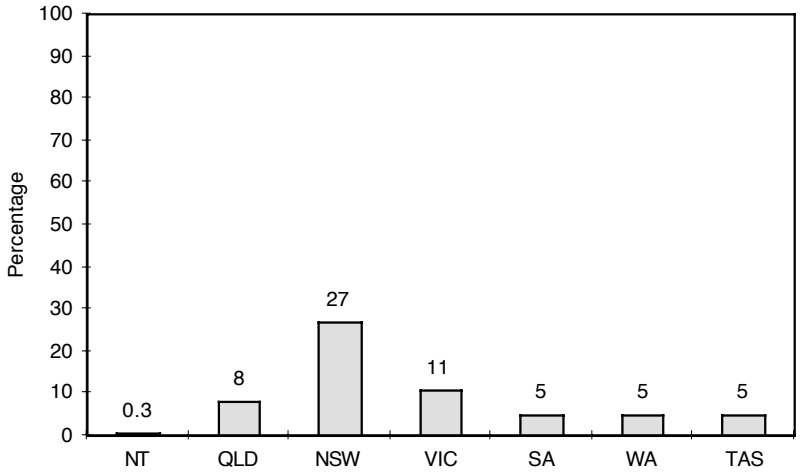


Figure 2.4: An estimate on the number of urban beaches in each state based on the assumption that the survey covered 90 per cent of Australia's urban beaches



Property and Infrastructure Development

Network members were asked to indicate the nature of property or infrastructure development within 250 metres of the high tide mark (SOS95 Beach Questionnaire, Question 6).

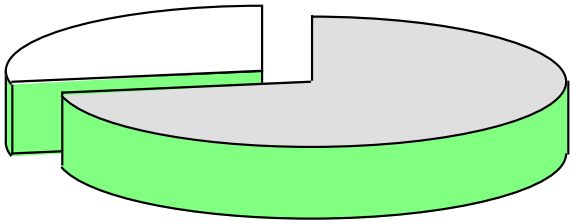
In response, network members specified some form of property or infrastructure development within 250 metres of the high tide mark at 72 per cent of the beach areas surveyed. Figure 2.5. presents the results.

In addition, network members were asked to indicate if the beach has lost it's dune to urban development (SOS95 Beach Questionnaire, Question 5). In response, network members identified 100 beaches (six per cent of the beach areas surveyed) that have lost their dunes to urban development. This figure does not include beach areas, like those on the Gold Coast, where beach-front property development infringes onto, but does not replace, the dunal system.

Box 2.3 The hazards of building too close to the beach

Australians like to live next to the beach which is fine except for the fact that most development to date has been sited too close to the subaerial zone thereby compromising, and in some cases replacing altogether, the littoral environment that provides an important buffer between the dynamic beach environment and the more stable hinterland. Once this buffer has been removed there is nothing left to protect the beach from erosion during tidal surges. If, and when, this happens the resulting loss of public amenity and threats to stability of beachfront property can necessitate the implemention of expensive engineering works like revetment walls and sand replenishment programs. The City of Gold Coast in South-East Queensland has spent more than $30 million dollars on coastal engineering works and beach replenishment programs since 1970[5] (approximately $1 million for every kilometre of beach). A further $53.4 million dollars is expected to be spent on the Tweed River Entrance Sand Bypassing Project[6].

There is property or infrastructure development within 250 metres of the high tide mark at 72 per cent of the beach areas surveyed



According to Network Members approximately 6 per cent of the beach areas surveyed have lost their dunal system to property or infrastructure development

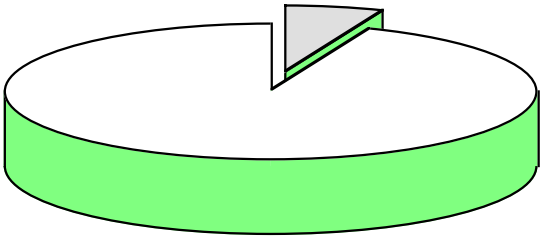
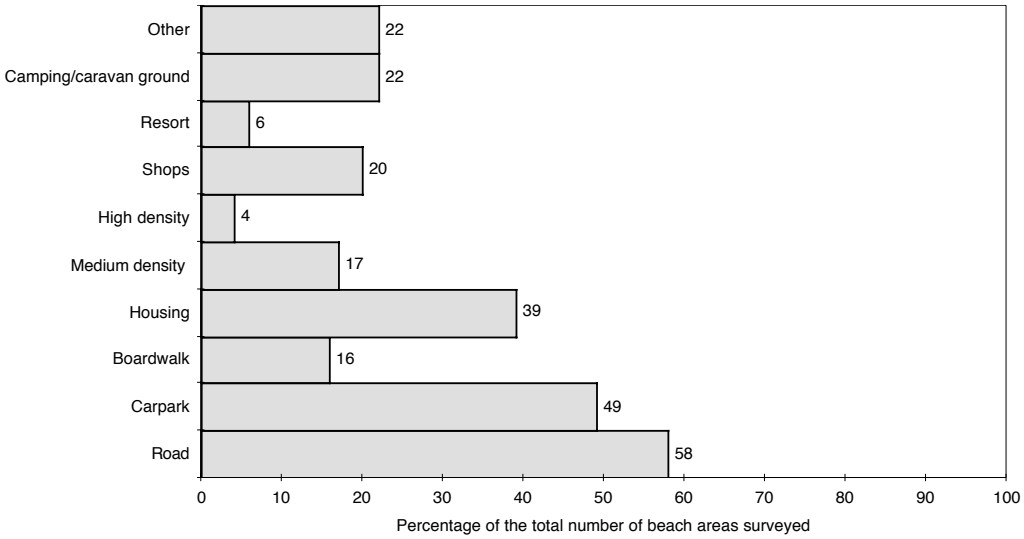


Figure 2.5: Type of property and infrastructure development within 250 metres of the high tide mark at beach areas surveyed



Box 2.4 Community involvement in planning and development in the coastal zone

According to the Resource Assessment Commission's 1993 Coastal Zone Inquiry, 90 per cent of all building activity in Australia between 1983 and 1991 took place in the coastal zone(1). With growing environmental awareness, communities and individuals around Australia are seeking a more pro-active role in the decision-making process. As a result, new developments are often thoroughly scrutinised and, if considered in-appropriate, can become the focus of community action in the form of public protest or political campaigning. In recent times we have seen community action involving a number of coastal developments including:

- Oyster Point Marina and Resort (Hinchinbrook, Queensland)
- Sandmining proposal (Shoalwater Bay, Queensland)
- Club Med Tourist Resort (Byron Bay, New South Wales)
- Sewerage Outfall (Look At Me Now Headland, New South Wales)
- Fern Bay Subdivision (Newcastle Bight, New South Wales)
- Shell Cove Boatharbour and Marina (South Shellharbour Beach, New South Wales)
- Crib Point Oil Terminal (Western Port Bay, Victoria)
- Rare Earth Plant and Dredging Proposal (Port Pirie, South Australia)
- Aquaculture Farm (Venus Bay, South Australia)
- Marina and Canal Estate (Perlubie Beach, South Australia)
- Resort and Housing Estate (Gnarabup Beach, Western Australia)
- Oakajee Industrial Park (Coronation Beach, Western Australia)

Development Proposals

Network members were asked to provide details of development proposals affecting beach areas surveyed (SOS95 Beach Questionnaire, Question 13).

In response, network members identified development proposals affecting 21 per cent of the beach areas surveyed, 44 per cent of which involve housing development. Figure 2.6 presents the results.

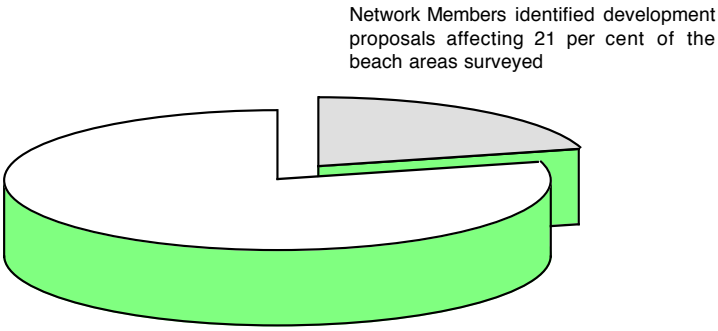
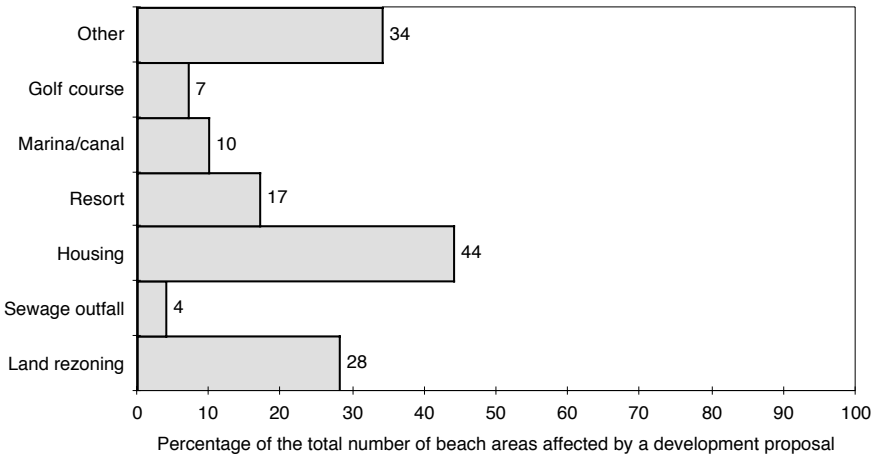


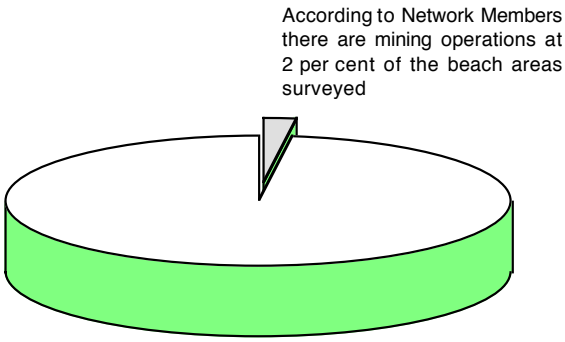
Figure 2.6: Nature of development proposals affecting beach areas surveyed as specified by network members



Mining Operations

Network members were asked to specify the nature of mining operations at beach areas surveyed (SOS95 Beach Questionnaire, Question 7).

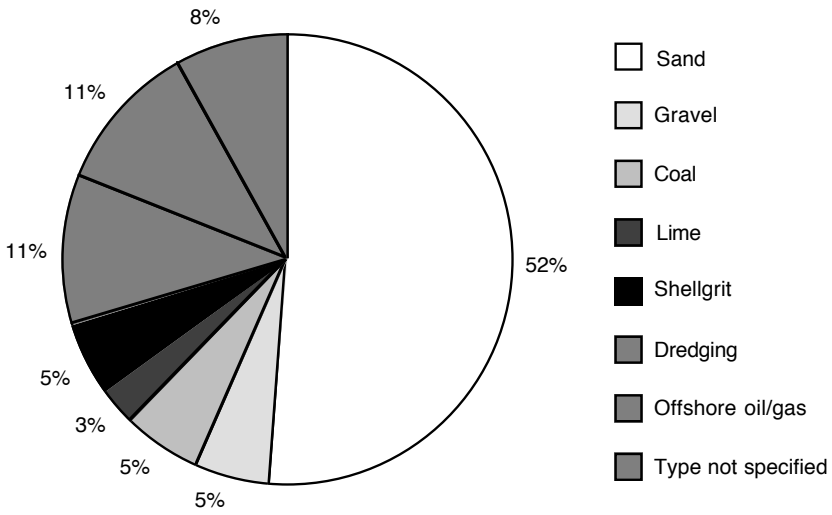
In response, network members identified mining operations at 38 (two per cent) of the beach areas surveyed. Figure 2.7 presents the breakdown of these.



Box 2.5 The sand-mining legacy

In 1993, respondents to the SOS Beach Survey by Surfrider Foundation found evidence of previous mining at 57 (13 per cent) of the 439 beaches surveyed[7]. In the majority of cases, evidence pertained to degraded dunal areas and poorly established revegetation. Of the 57 beaches, 42 (70 per cent) are located on the north coast of New South Wales, an area that was heavily sand-mined during the 1960s and 70s when New South Wales dominated world supplies of mineral sands. At the time, mining companies introduced Bitu bush as a quick-fix dune stabiliser. Bitu bush, which is an extremely invasive plant from South Africa, has gone on to colonise beaches throughout NSW and other areas where it has been introduced.

Figure 2.7: Breakdown of mine types at beach areas surveyed



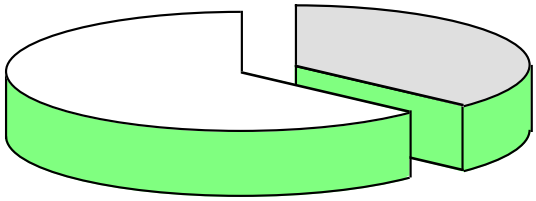
2.3 Non-Native Flora

Network members were asked to indicate whether there are any non-native flora colonising the dunes at beach areas surveyed and, if so, to list their names and indicate the extent of coverage (SOS95 Beach Questionnaire, Question 4b).

In response, network members identified one or more non-native flora species at 37 per cent of beach areas surveyed. Figure 2.8 presents the breakdown of the incidence of these in each state.

The species identified by network members were, in most cases, 'common knowledge' species like bitu bush and boxthorn (see Table 2.3). It is obvious from the results that the majority of network members do not have the botanical expertise to identify species, nor are they aware of, or able to access, botanical surveys.

Network Members identified non-native plant species at 37 per cent of the beach areas surveyed



Box 2.6 Not all non-natives are exotics

There is an important distinction between *exotic* plant species, that have their origin from other continents or islands and *non-indigenous natives* whose natural habitat is another geographic location or bio-region of the same continent. An example of a non-indigenous native is the Umbrella tree, native to Queensland Wet Tropics, which can be found throughout South East Queensland and Northern New South Wales. *Locally native* refers to a species of plant whose natural range extends into the area under consideration, and *locally endemic* refers to plants whose natural range is limited to a particular locality. Locally endemic species are generally regarded to have the highest conservation value.

Non-locally native plant species are undesirable for a number of reasons:

- They can limit, and eventually exclude, locally endemic species.
- They can have adverse effects on soil chemistry (eg effects of Lantana on soil nitrogen).
- They can reduce the front-line wind barrier resulting in degradation of adjacent less salt-tolerant native vegetation.
- Weeds with dense ground cover, like Singapore Daisy, can inhibit germination of native plant seed.

In the mitigation and control of weed species it is important to appreciate that weeds, like natives, help to provide stability to dunal areas, and also provide habitat to fauna species that have adapted to the new fodder and three dimensional habitat structure. As such, when formulating management strategies for removal or mitigation of weeds it is important to take into account this 'inherited' ecological role. The Bradley Method of regeneration encourages weed removal at rates in which they can be replaced by natives. Such methods can be extremely slow and, as such, require dedicated volunteers and a good public-relations program. For example, removal of a major Lantana infestation using the Bradley Method would proceed at a rate of one to three metres per year on each front.

Figure 2.8: Percentage of beach areas within each state where exotic and other non-native flora were identified by network members.

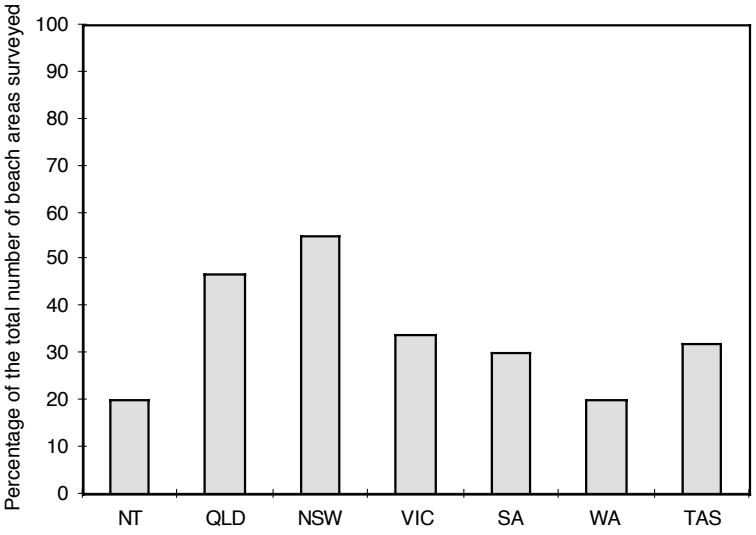


Table 2.3: Common non-native flora identified by network members

Northern Territory	
Mica Beach to Lee Point	Tamarinda and other introduced grasses
Queensland	
Cape Tribulation to Mackay	Indian Almond, Coconut Palms, Lantana, Rubbervine
Mackay to Caloundra	Prickly Pear, Bouganvillea, Lantana, Mossman River Burr
Caloundra to Tweed Heads	Norfolk Island Pines, Groundsel, Lantana
New South Wales	
Tweed Heads to Port Stephens	Bitu, Lantana
Port Stephens to Shellharbour	Bitu, Lantana
Shellharbour to Cape Howe	Bitu, Lantana
Victoria	
Mallacoota to Cape Otway	Blackberries, Boxthorn, Marram Grass, Caprosma
South Australia	
Port MacDonnel to Adelaide	Boxthorn, Kikuyu, Couch, Marram Grass
Adelaide to Fowlers Bay	Boxthorn, Bridal Creeper, Onion Weed
Western Australia	
Esperance to Geraldton	Boxthorn, Marram Grass
Geraldton to Cape Leveque	Buffel Grass, Kapok Bush, Onion Weed
Tasmania	
Tasmania general	Blackberries, Marram Grass, Pine Trees

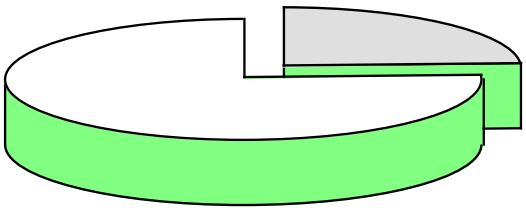
2.4 Direct Pollution Sources

Stormwater Outlets

Network members were asked to identify if there are stormwater outlet pipes discharging to beach areas surveyed and, if applicable, to specify litter categories evident in the vicinity of pipe discharge at the time of survey (SOS95 Beach Questionnaire, Question 8).

In response, network members identified stormwater outlet pipes discharging to 24 per cent of the beach areas surveyed. Figure 2.9 presents the breakdown in each state. Of the beaches with pipes, 56 per cent had litter evident in the vicinity of pipe discharge at the time of survey. Figure 2.10 presents the breakdown of litter categories found.

Network Members identified stormwater outlets at 24 per cent of the beach areas surveyed



Box 2.7 Stormwater outlets: a major pollution source

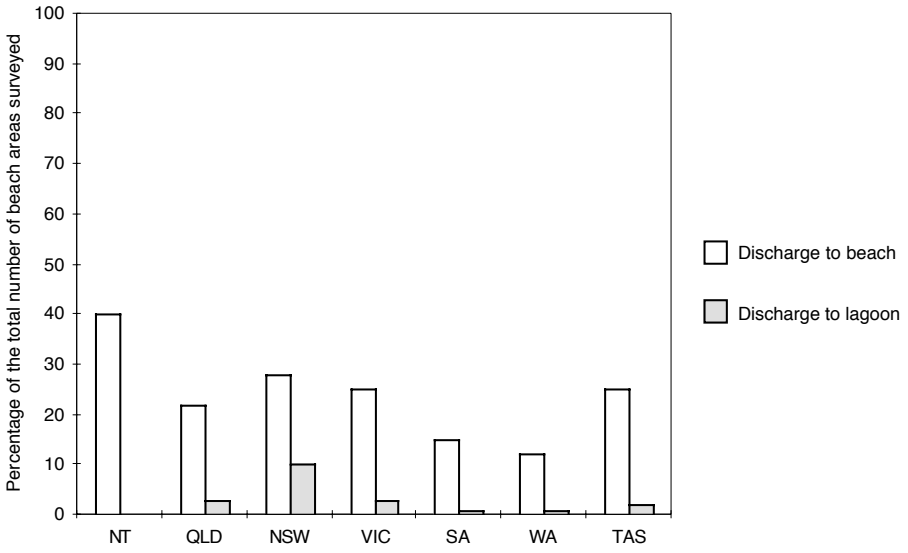
Urban runoff, whether collected and channelled through a stormwater system or not, is not usually treated before discharge to the receiving environment. Pollutants that can be inadvertantly 'picked up' by urban runoff include:

- oil leaked from car engines and other sources;
- heavy metals leached from road surfaces and other sources;
- silt, pesticides, and nutrients from private and public gardens;
- bacteria and nutrients from animal faeces;
- bacteria and nutrients from sewerage overflow pipes;
- litter and debris from footpaths, gutters, roadways and other public areas;
- anything else dumped intentionally or otherwise into the system.

According to a recent study, urban runoff contributes 37 per cent of the world's ocean oil pollution[8]. In comparison, shipping vessels and boats account for 33 per cent and shipping accidents account for 12 per cent.

Improving the design of our stormwater systems, including the provision of litter traps, sediment traps, natural drainage systems, and stormwater retention ponds, can help mitigate the impacts of urban runoff. Public education campaigns also help. For example, Melbourne Water's "Care for the Bay - Don't Throw it Away" uses graphical images to demonstrate how rain washes litter into Port Phillip Bay via the stormwater system.

Figure 2.9: Incidence of stormwater outlet pipes at beach areas surveyed



There was litter evident in the vicinity of pipe discharge at 56 per cent of the beach areas with stormwater pipes

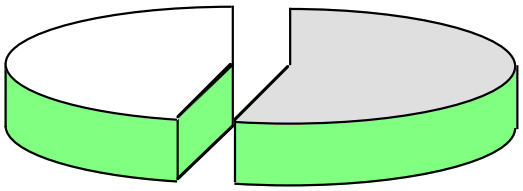
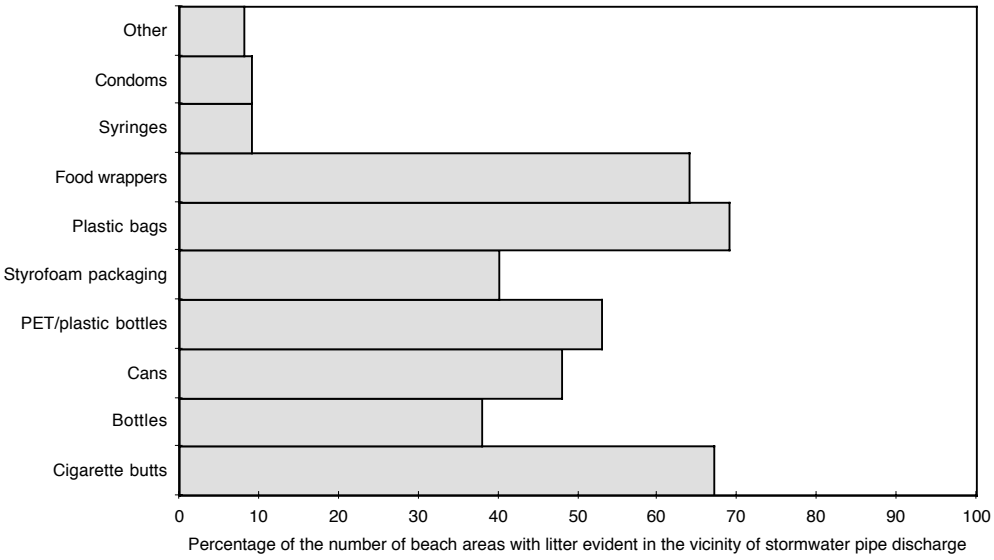


Figure 2.10: Litter categories evident in the vicinity of stormwater pipe discharge at the time of survey



Sewerage Outfalls

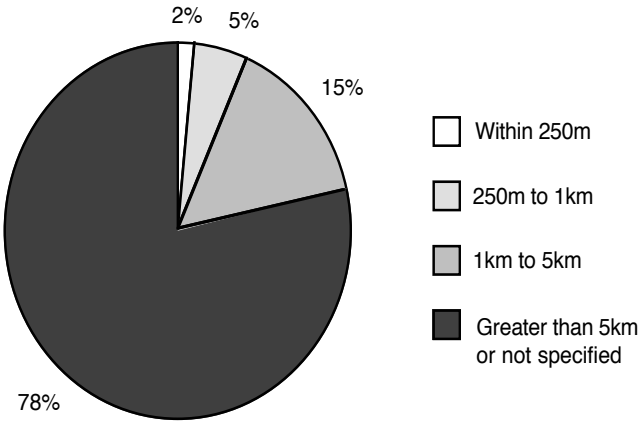
Network members were asked to identify sewerage outfalls discharging in the vicinity of beach areas surveyed and, where possible, to provide basic technical data including the level of sewerage treatment, discharge volume and, if applicable, percentage of effluent re-use (SOS95 Beach Questionnaire, Question 8).

In response, network members identified 141 public sewerage outfalls. Of these 86 (66 per cent) discharge to the ocean and 45 (35 per cent) discharge to estuaries. Approximately 21 per cent of the beach areas surveyed are located within five kilometres of one of these outfalls (see Figure 2.11). The breakdown of treatment standards is presented in Figure 2.13. Note that 32 outfalls are still discharging primary treated effluent or worse.

According to network members, there is re-use of treated effluent from approximately 16 per cent of these systems. In the majority of cases, re-use is for the irrigation of public parks, golf courses and similar.

Appendix 5.4 presents a full listing of the 141 outfalls identified by network members. Note that these outfalls have a combined discharge of approximately four billion litres per day.

Figure 2.11: Distance to public sewerage outfalls from beach areas surveyed



Box 2.8 Sewerage treatment in Australia

According to a 1994 study commissioned by the Australian Water and Wastewater Association (AWWA) there are approximately 710 public sewerage treatment plants in Australia servicing 84 per cent of the population[9]. Of these, the overwhelming majority are activated sludge, 170 are lagoons of one sort or another, and 45 are primary treatment or worse.

In terms of volume the majority of sewage handled is collected, treated and discharged in the coastal zone where 90 per cent of Australians live. The bulk of this treated effluent ends up in the marine environment, either direct via ocean outfalls or indirect via discharge into rivers and creeks.

Figure 2.12: Receiving environment for the 141 public sewerage outfalls identified by network members

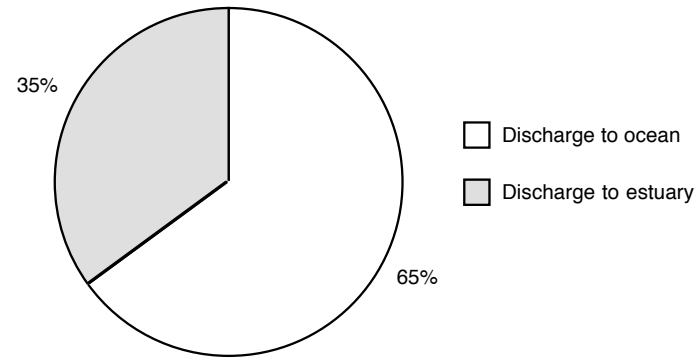
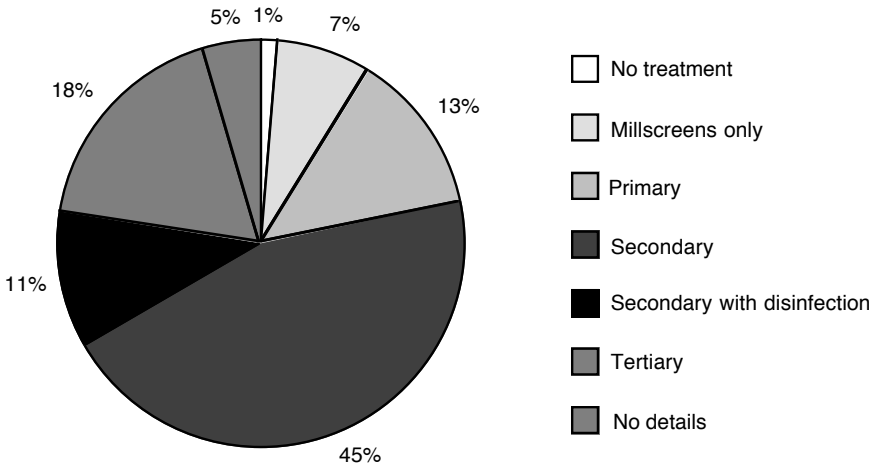
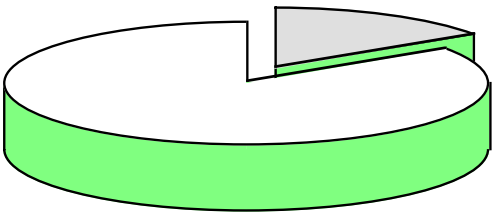


Figure 2.13: Treatment standards at the 141 public sewerage outfalls identified by network members



Re-use of treated effluent occurs at 23 (16 per cent) of the 141 public sewerage systems identified by Network Members.



2.5 Pollution via Catchment

Network members were asked to provide details of pollution sources reaching the beach via a river or creek (SOS95 Beach Questionnaire, Question 11).

In response network members listed 361 water courses including not just rivers and creeks, but lakes, lagoons, wetlands and canals as well (see Figure 2.14). The breakdown of pollution sources cited by network members as affecting these water courses is presented in Figure 2.15.

Whilst the data is purely anecdotal it does provide an overview of water courses within each coastal catchment that are perceived by network members to be compromised by a pollution source of one sort or another. Appendix 5.5 presents a full listing of the water courses identified.

Box 2.9 Integrated Catchment Management: a useful management tool

All forms of land use produce pollution sources that, via surface-water runoff or groundwater, can impact on our freshwater and marine environments.

Integrated Catchment Management (ICM) uses hydrological boundaries (catchments), rather than political jurisdictions, to identify and manage sources of water pollution. These can point sources like sewerage outfalls and stormwater pipes or diffuse sources like runoff from agricultural land. The benefit of ICM is that it takes a whole-of-catchment approach to reducing and mitigating sources of water pollution.

Various governments in Australia have introduced ICM programs to target specific catchments in a prioritised way. Programs generally involve the identification of pollution sources, assessment of the impacts, development of management strategies, and finally implementation of the strategy.

Public education programs are fundamental to the success of ICM. A good example of an innovative approach to public education is the booklet, *Loders Creek : Caring For Our Backyard Habitat*, produced by the Loders Creek Integrated Catchment Management Committee in conjuction with the Gold Coast City Council and Surfrider Foundation[10]. This booklet was distributed, free of charge, to every household within the Loders Creek catchment area and has made a significant contribution to the knowledge and care of Loders Creek by local residents. Copies of the booklet can be obtained by contacting Wet Paper Publications on (07) 5597 2806.

Figure 2.14: Breakdown of water-courses identified by network members as being a source of beach pollution via their respective catchments.

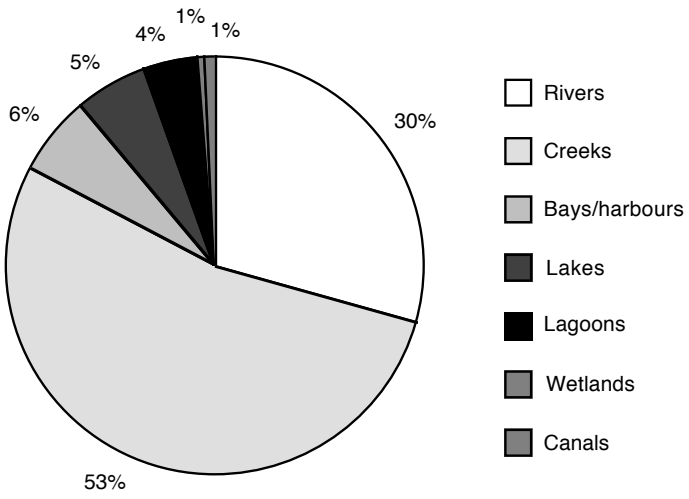
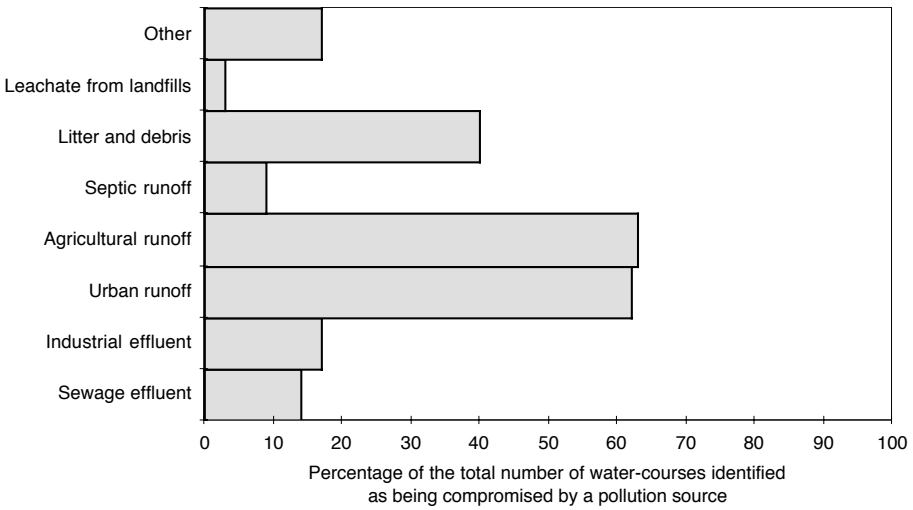


Figure 2.15: Pollution sources via catchment as specified by network members.



2.6 Litter

Network members were asked to identify litter types evident at beach areas surveyed (SOS95 Beach Questionnaire, Question 10).

In response, network members identified one or more litter categories at approximately 80 per cent of the beach areas surveyed. Figures 2.16 and 2.17 present the results. The most common litter types found were food wrappers, plastic bags, cans and cigarette butts.

"By far, what stood out as being the biggest pollutant of our beaches is the amount of rubbish left behind."

Box 2.10 Washed ashore or left behind: litter is a big problem

The survey results confirm that litter is evident just about everywhere including remote and isolated beaches. Sources of litter vary from recreational users and stormwater pipes to shipping and other offshore sources including fishing vessels and recreational boats. There is no doubt that litter from offshore sources is a major contributing factor, particularly in remote areas. It is estimated by industry sources in figures available from the Australian Maritime Safety Authority that approximately 5.5 million items of rubbish are discarded from ships at sea every day. With so many of Australia's beaches free from all other impacts except litter, comments provided by network members help to put the problem in perspective.

"By far, what stood out as being the biggest pollutant of our beaches is the amount of rubbish left behind. The photos show only a couple of places but represent many." Barry, Victoria's relatively remote far east coast.

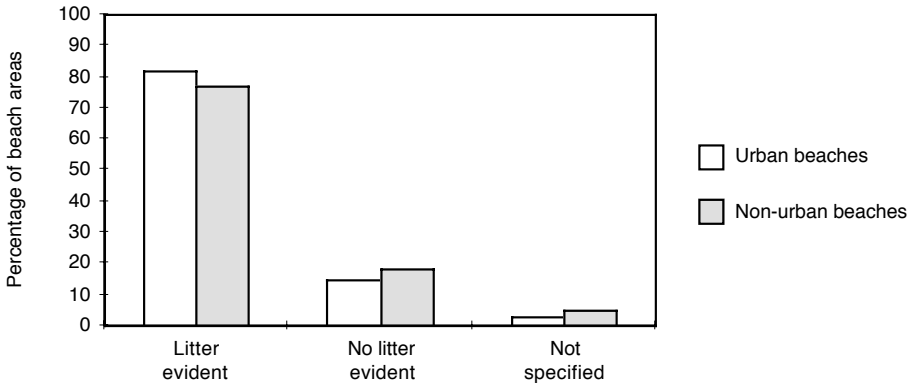
"We stayed for four days and found there was a mission to be started. As we travelled to our campsite along the beach, freshwater creeks flowed to the ocean. To our shame, they were surrounded by rubbish, scattered for miles up and down the whole length of the beach. 80 per cent of the rubbish came from the ocean washed up with the tides." Craige and Tam, Queensland's Cooloola Coast.

Surfrider Foundation often receives correspondence from people outside the network. One such comment is particularly pertinent to the problem of marine debris.

"Last year I served on one of those big warships based in Sydney. The ship I was on carried about 25 of those Solo bins for rubbish. At sea when all the bins are full, and we can't just pull into a port to get rid of the rubbish, guess where it goes? Yep over the side . . . I couldn't bear to see the trail of rubbish left in the water (scattered) over a few kilometres," Roger, Royal Australian Navy.

Figure 2.16: Incidence of litter as specified by network members

a) in carpark and access paths



b) on beach and dunal areas

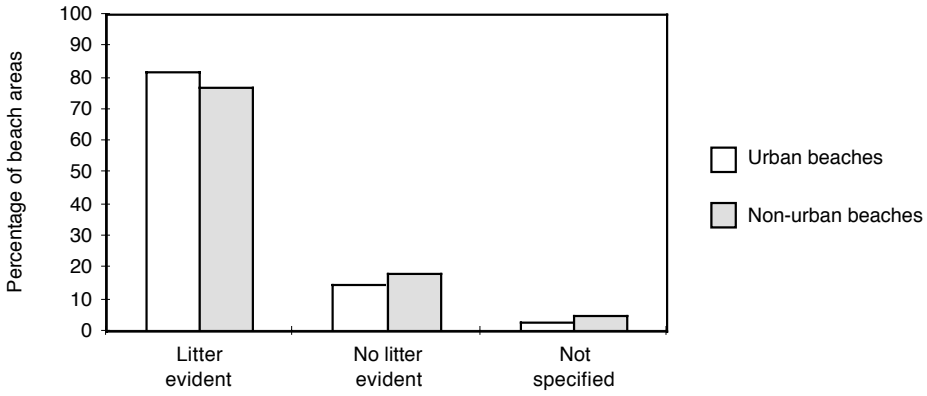
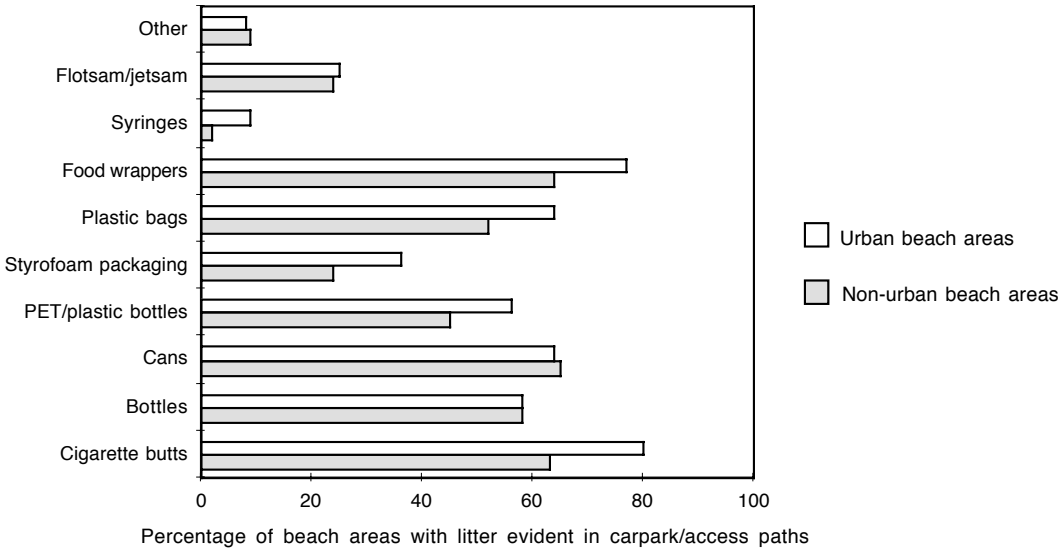
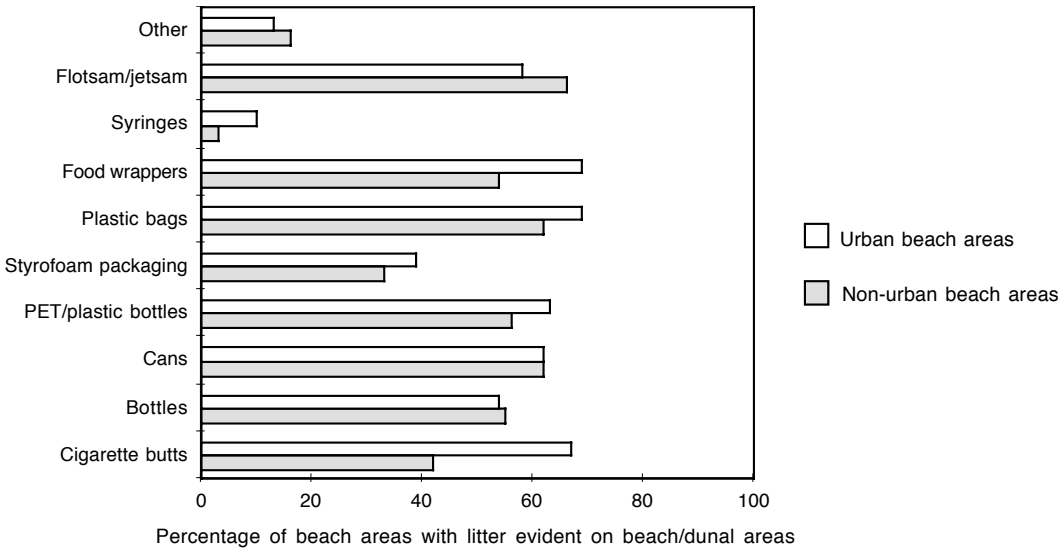


Figure 2.17: Breakdown of litter categories evident at the time of survey

a) in carparks and access paths



b) on beach and dunal areas



2.7 Beach management

Dune Fencing

Network members were asked to indicate if dunal vegetation is fenced from the beach itself, from four wheel drive tracks, walkways or access paths (SOS95 Beach Questionnaire, Question 4c).

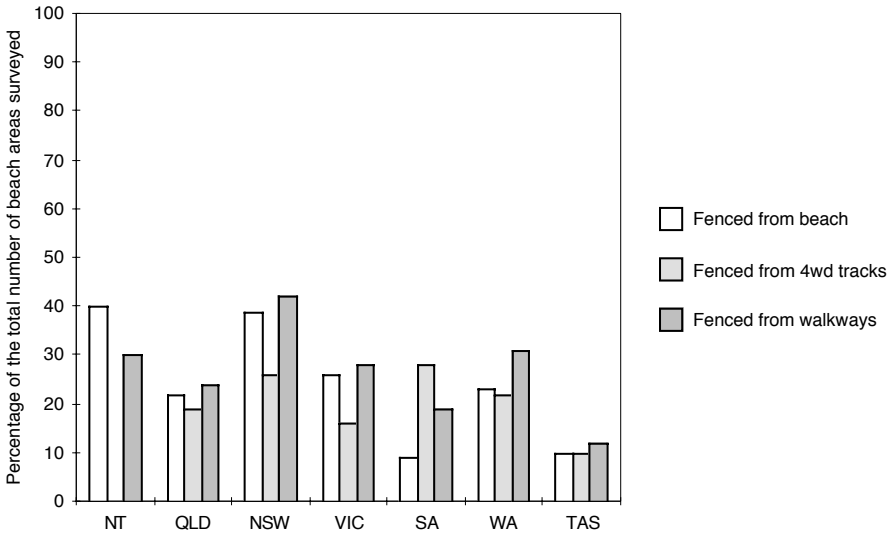
In response, network members indicate some form of dune fencing at approximately 30 per cent of beach areas surveyed. Figure 2.18 presents the breakdown in each state.

Box 2.11 The importance of dune vegetation and the need for fencing

Vegetation plays an important role in the formation and stabilization of coastal sand dunes. It anchors sand in the dune as well as trapping wind blown sand. In addition, stable frontal dunes act as a reservoir of sand to nourish the beach during tidal surges. Damage to, or destruction of, dunal vegetation can result in wind erosion and instability. When this happens the dune becomes a less effective barrier against tidal surges. Where beach areas are losing sand due to natural erosion the presence of dunal vegetation can lower the rate of recession.

Pedestrian traffic and four wheel drives can impact heavily on dunal vegetation, creating tracks free of vegetation that are then open to erosion by wind. Dune fencing helps to protect dunal vegetation from wayward pedestrian and vehicular traffic. Dune fencing is also used by shire councils when trying to re-establish dunal areas that have been compromised by mining or urban development.

Figure 2.18: Incidence of dune fencing at beach areas surveyed within each state.



Box 2.12 Dune care: an important contribution to beach welfare

Dune care work including the provision of fencing, removal of exotics and regeneration of degraded areas is an important contribution to beach conservation, particular in the repair of areas degraded by urban development, sand mining, or recreational use. Shire councils often carry out dune care work, but limited budgets can restrict their efforts to popular recreational beaches. Other, less popular, beaches can be neglected and this is where Dune Care groups, established as part of the national Landcare program and staffed by volunteers, provide assistance. Dune Care groups repair beach areas that would otherwise have been neglected. Dune Care groups can tackle everything from the hands-on repair work like dune fencing and revegetation, through to flora and fauna surveys and public education programs. To find out about the nearest Dune Care group simply contact your shire council for details.

Dune Care

Network members were asked to indicate if there is some form of dune care at beach areas surveyed (SOS95 Beach Questionnaire, Question 4c).

In response, network members indicate dune care at 35 per cent of the beach areas surveyed. Figure 2.19 presents the breakdown in each state.

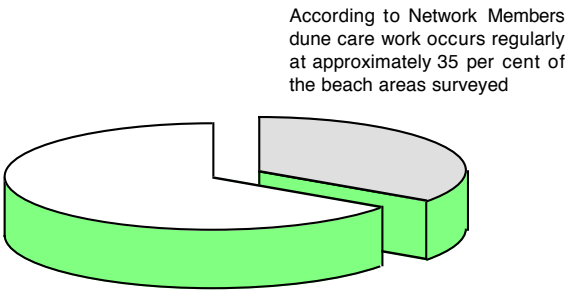
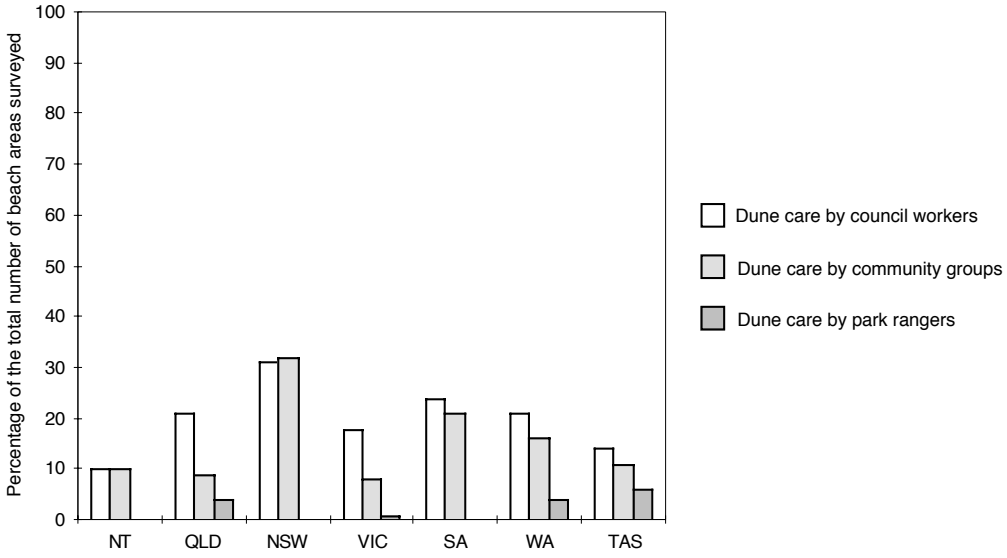


Figure 2.19: Incidence of dune care at beach areas surveyed within each state

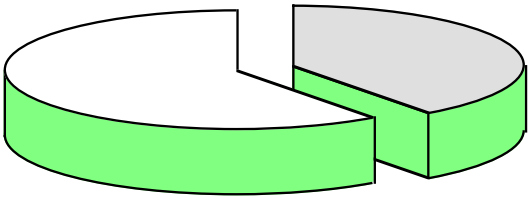


Litter Removal

Network members were asked to specify what groups, if any, regularly remove litter from beach areas surveyed (SOS95 Beach Questionnaire, Question 10c).

In response, network members specified one or more groups at approximately 40 per cent of the beach areas surveyed. Figure 2.20 presents the breakdown in each state.

According to Network Members there are regular litter clean-ups at approximately 40 per cent of the beach areas surveyed



Box 2.13 Clean-up events, container deposit legislation, packaging guidelines and controls: a three-pronged attack on the litter problem

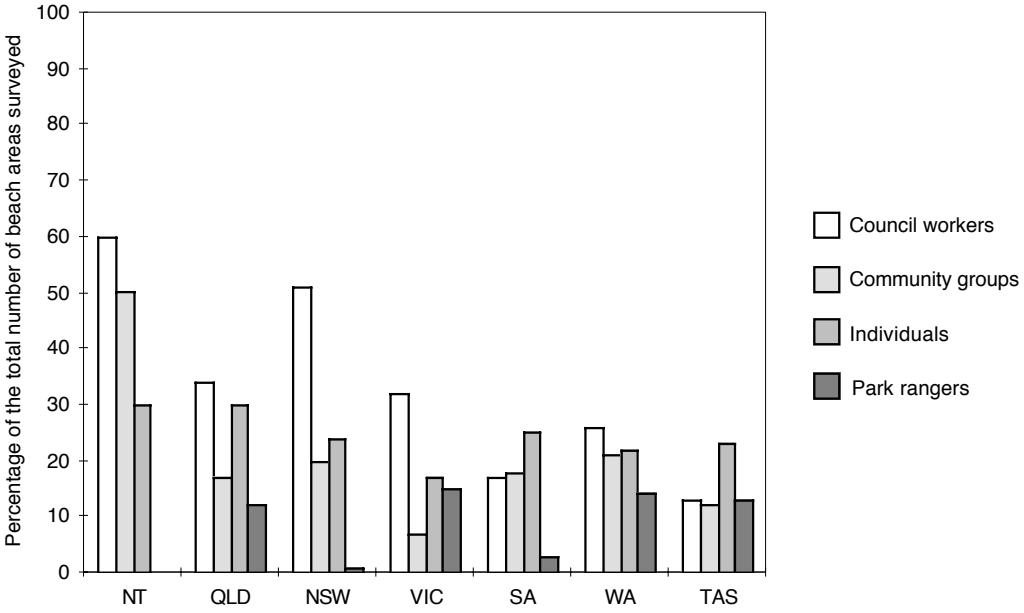
Litter causes aesthetic and environmental pollution and is hazardous to the health of animals and humans alike. Graphical images of seals strangled by plastic debris help to raise public awareness but to be truly effective, public education must be backed by community action and legislation if necessary.

The success of voluntary clean-up events, like Clean Up Australia Day, demonstrates the willingness on the part of individuals to help tackle the litter problem. It is time that governments and the private sector acknowledged this willingness and implemented positive action for change like Container Deposit Legislation (CDL) and packaging guidelines and controls.

CDL is all about encouraging people to recycle by providing a financial incentive to do so. South Australia has had CDL in place since the early 1970s and recycles more than double the tonnage per individual than anywhere else in Australia[11].

In addition to CDL, packaging guidelines and controls can help reduce the volume of packaging generated by department stores and supermarkets. Under such a proposal, consumers are given the choice of either leaving packaging at the place of purchase, or returning it to the place of purchase, thereby encouraging retailers to reduce or re-use the packaging they generate. Designers and manufacturers can help by creating 'environmentally friendly packaging' that is either re-usable, recycleable and/or lightweight and biodegradable.

Figure 2.20: Incidence of regular litter clean-ups at beach areas surveyed in each state

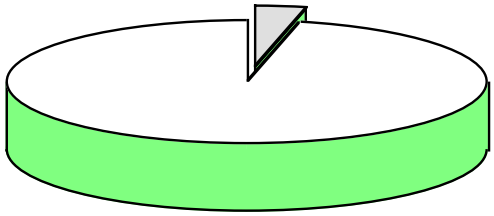


Sand Grading and Replenishment

Network members were asked to indicate if beach sand is regularly graded and/or replenished at beach areas surveyed and, if applicable, to specify the number of groynes along the beach length (SOS95 Beach Questionnaire, Question 1).

In response, network members identified regular grading of sand at 110 (seven per cent) of the beach areas surveyed, intemittent sand replenishment at 59 (four per cent), and one or more groynes at 105 (seven per cent). Figure 2.21 presents the breakdown in each state.

According to Network Members shire councils replenish sand at four per cent of the beach areas surveyed



Box 2.14 Beach sand: an integral part of the beach experience

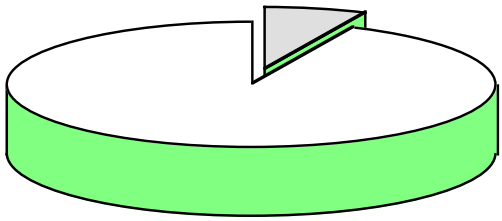
Sand grading and, when necessary, replenishment are used by shire councils to help maintain public amenity at recreational beaches.

Sand grading serves the dual purpose of removing litter and re-invigorating the aesthetic feel of the sand surface. Sand grading is generally a once-a-week occurance for popular urban beaches. In some areas, like the Gold Coast for example, beaches are often graded several times a week during peak user periods.

Sand replenishment programs are undertaken intermittently if and when beach erosion threatens public amenity. These programs generally involve the gradual replenishment of sand using a pump or truck. Sand for this purpose is usually recovered from rivermouths or offshore bars using a dredge. Because of the costs involved, replenishment programs are used sparingly and only when absolutely necessary.

Beach erosion is, essentially, a natural process where, with the aid of wind and swell, sand is lost to dunal areas or swept offshore. Sand-mining and urban development can sometimes exacerbate the problem by removing dunal buffers that help protect a beach from erosion. Groyne construction can also exacerbate the problem by upsetting the natural sand budget. For example, extension of the Tweed River training walls in the early 1960s effectively blocked what was once a natural supply of sand to Gold Coast beaches. As a result, the Gold Coast has experienced accelerated levels of beach erosion ever since[5]. In an attempt to redress the problem, the Gold Coast city council in conjuction with the New South Wales government is intending to install a permanent sand by-pass system at the Tweed River entrance.

According to Network Members shire councils regularly grade sand at seven per cent of the beach areas surveyed



According to Network Members there are groynes located at seven per cent of the beach areas surveyed

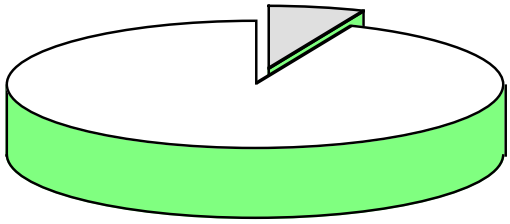
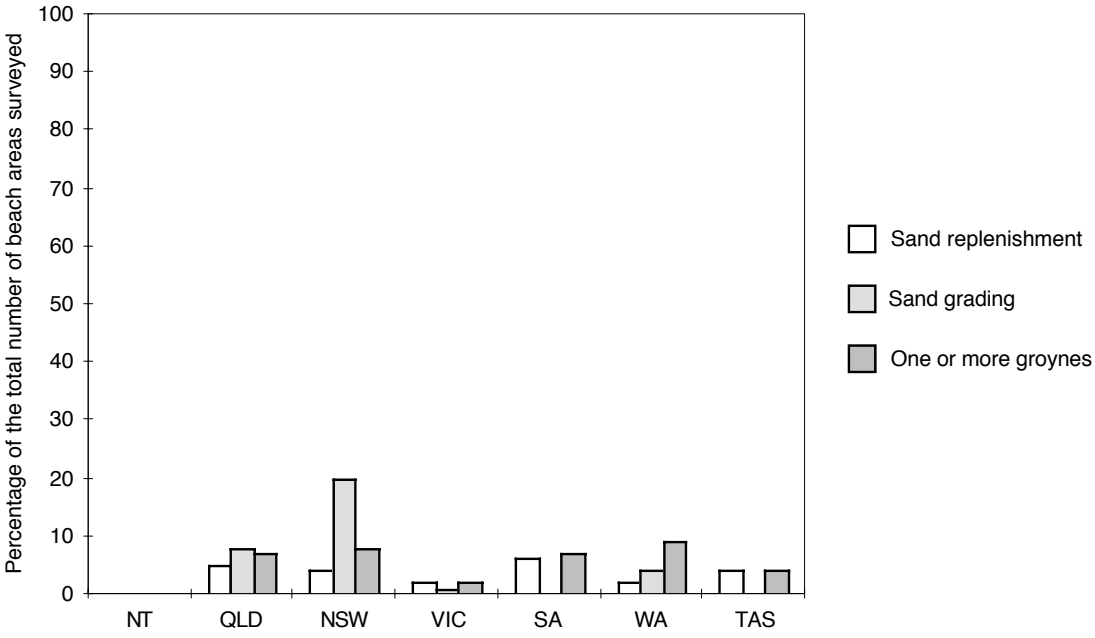


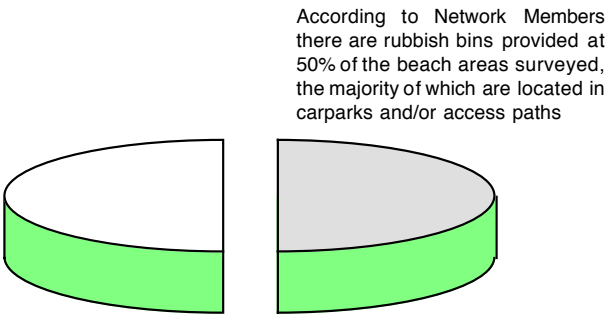
Figure 2.21: Incidence of sand grading, replenishment and groynes at beach areas surveyed



Rubbish Bins

Network members were asked to indicate whether there are bins located on the beach or in carparks and access paths at beach areas surveyed (SOS95 Beach Questionnaire, Question 10).

In response, network members identified rubbish bins at approximately 50 per cent of beach areas surveyed, most of which are located in carparks or access paths. Figure 2.22 presents the breakdown in each state.

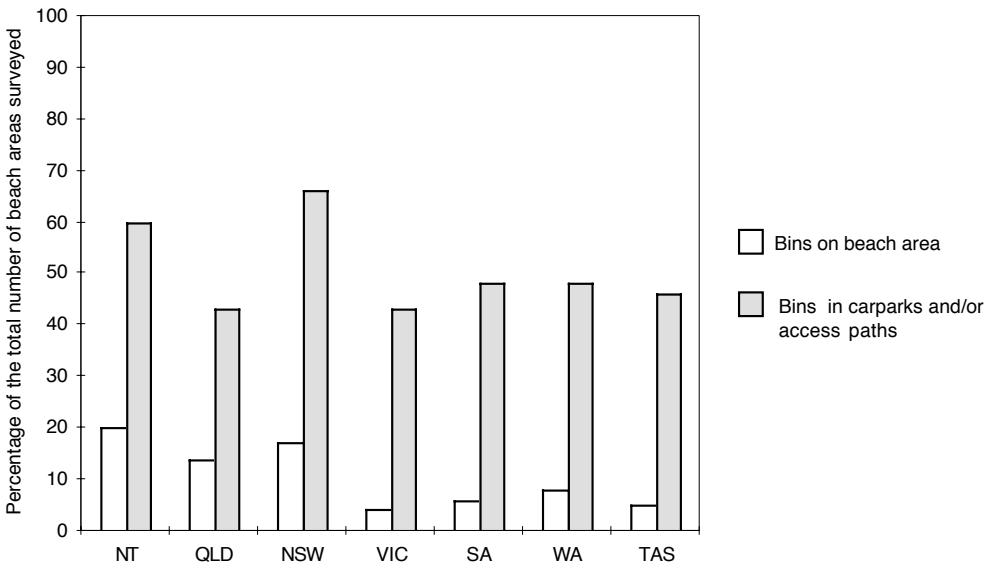


Box 2.15 Rubbish bins: useful, but only if serviced

The provision of rubbish bins helps to reduce litter by providing a receptacle for people's rubbish. However, if bins are not serviced in a way that meets demand they can exacerbate the litter problem by encouraging people to leave their rubbish behind, rather than take it home with them. When bins are full animals and wind can spread rubbish around a site area thereby creating a real nuisance. For this reason, there has been a trend in recent years to remove rubbish bins from National Parks and the like.

The fact that recreational users are leaving litter behind at even the most remote beach areas indicates that, rather than simply providing more bins in areas that cannot be serviced, there needs to be greater public awareness aimed at encouraging people to take their rubbish home with them. These campaigns should target specific groups like surfers and fishermen and, perhaps, be funded by industry groups.

Figure 2.22: Incidence of rubbish bins at beach areas surveyed



2.8 Public Access and Recreational Use

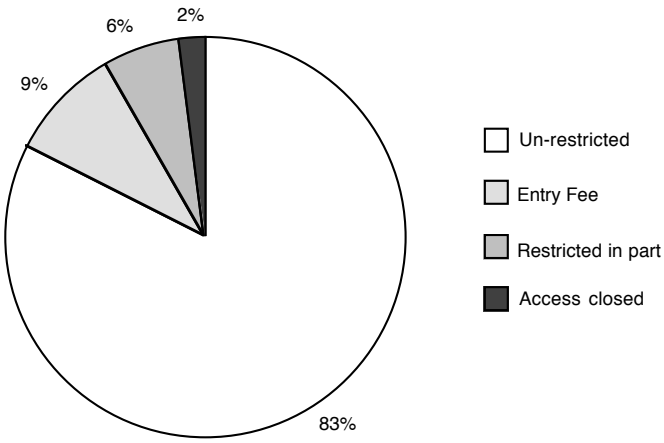
Public Access

Network members were asked to indicate if public access to beach areas surveyed is unrestricted, restricted in part, closed, or requires payment of an entry fee (SOS95 Beach Questionnaire, Question 2).

In response, network members indicate that 1370 (83 per cent) of the beach areas surveyed have unrestricted public access, 150 (nine per cent) require an entry fee or permit, 103 (six per cent) are restricted in part (that is public access is hindered but not prevented entirely), and 36 (two per cent) are closed to the public.

Figures 2.23, 2.24 and 2.25 present the results. Note from Figure 2.25 that in 49 per cent of cases, network members did not specify the nature or type of private property restricting access. However, corresponding answers to question 3 pertaining to adjacent land classification indicate that in the majority of cases it is farming property restricting access.

Figure 2.23: Public access to beach areas surveyed



Box 2.16 Free access: an Australian birthright

Public access to Australian beaches is, in the main, unrestricted and free of charge. Regulations governing behaviour in public places apply with, in addition, beach specific regulations like the banning of dogs on urban beaches.

When access requires a permit or entry fee it is generally because the beach is located within a conservation reserve. Access restrictions are rare although, as the survey results indicate, whenever beach-front property hinders public access it is often perceived to be an access restriction. Restrictions can also occur when you have beach-front farming property with no provision for public access as occurs on King Island and along many other rural areas around Australia. In this situation, it is at the discretion of the property owner as to whether they allow access or not. Titles to beach-front rural land can often extend to the high water mark and this can create problems with the grazing of animals on dunal areas. Mining leases extending to shore-lines can also restrict access, for example the Clough Resources Mining Lease at Shark Bay or the shore-base leases on Thevenard, Airlie, Barrow and Varanus Islands.

Figure 2.24: Reasons specified by respondents for restricted access

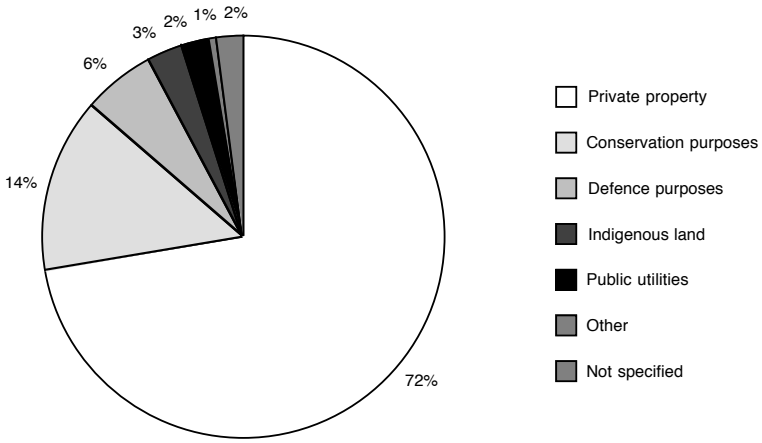
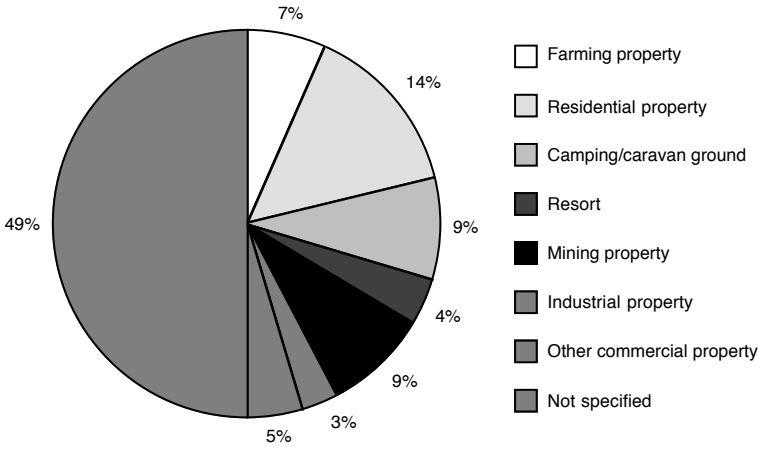


Figure 2.25: Private property type restricting access



Box 2.17 Beach, sport and recreation: a billion dollar industry

Australia's beaches provide the setting for a wide variety of recreational pursuits attracting millions of participants every year. According to figures provided by the Australian Association of Surfing Professionals (ASP) there are as many as two million surfers who regularly use the surf zone four or more times per week[12]. Many more use the surf zone on weekends and/or during public holidays. Add to these, those who fish, walk, run, picnic, sightsee, meditate, . . . the list goes on, and you begin to appreciate just how intrinsic beaches are to the Australian way of life.

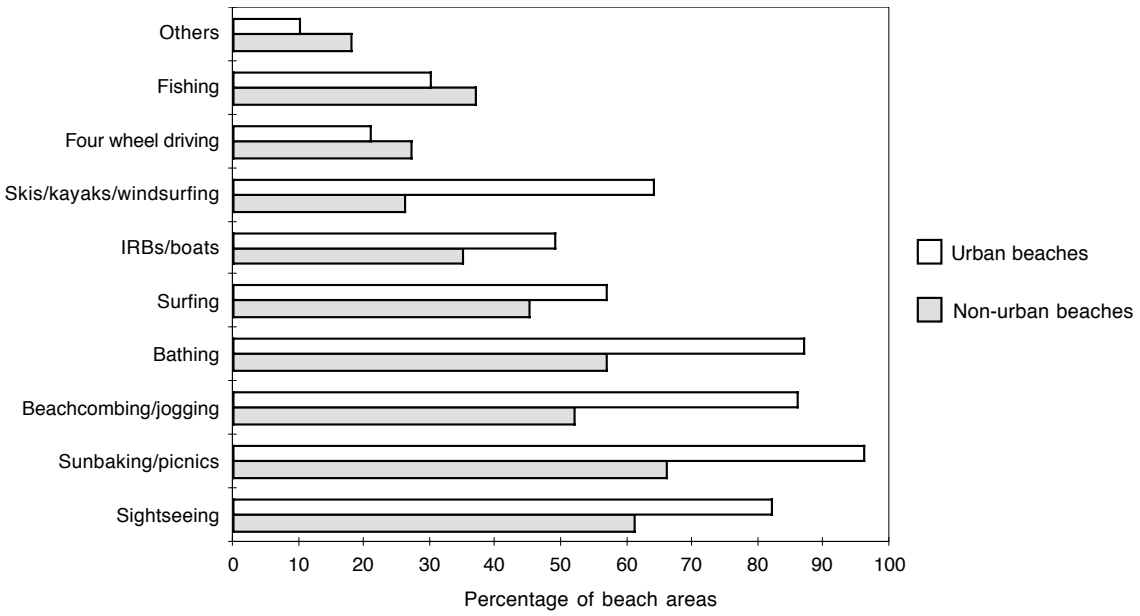
Beach related sports, activites and culture have spawned their own clothing, equipment, and accessories industries that generate billions of dollars every year. According to the ASP, the wholesale retail surfing industry alone is worth more than $500 million a year. In considering these benefits it is important to remember that our beaches are a resource that come free of charge and, as such, it is our duty to protect them from environmental harm so that future generations do not inherit a diminished resource.

Recreational User Groups

Network members were asked to specify the types of recreational user groups who regularly use beach areas surveyed (SOS95 Beach Questionnaire, Question 12).

Figure 2.26 presents the results. It is worth noting that four wheel driving and beach fishing are the only activities where non-urban beaches score, on a percentage basis, higher levels of recreational use than urban beaches.

Figure 2.26: Recreational activities at beach areas surveyed as specified by network members



3. Regional Summaries

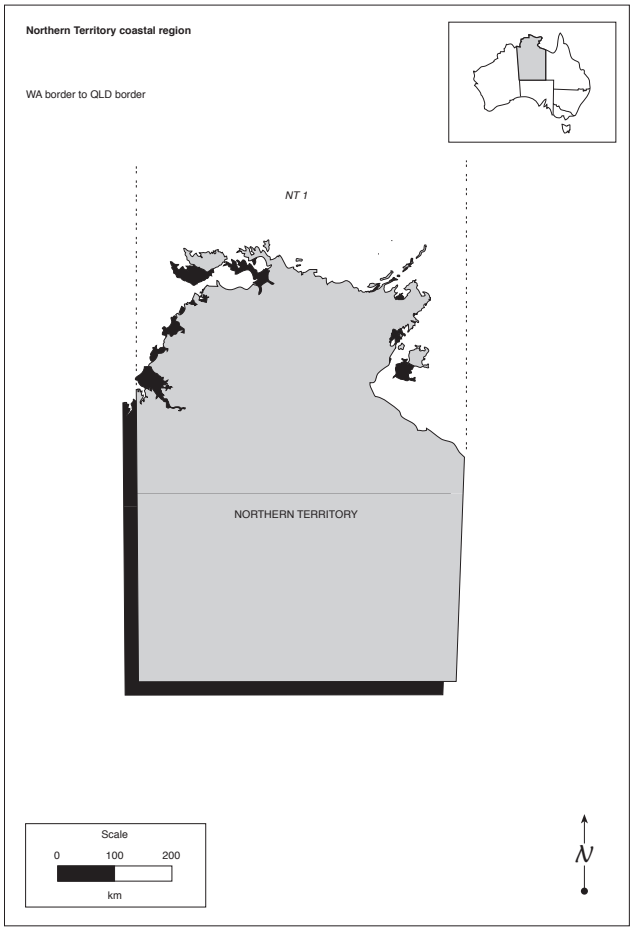
This section presents a descriptive summary of the data for each region, island, and island grouping together with regional maps showing the names and locations of beaches surveyed.

General information in addition to that provided by network members has been sourced from the Readers Digest Guide to the Australian Coast[13].

Regions, islands and island groupings are assigned a rating according to the following key*:

- • heavily populated: high impacts
- •• moderate to heavily populated: moderate to high impacts
- ••• moderately populated: moderate impacts
- •••• sparsely populated: low impacts
- ••••• pristine

*Ratings provide a general categorisation only and are not based on any empirical formula.



3.1 Northern Territory

Northern Territory has a coastline, including major islands, of approximately 7, 200 kilometres[14]. Along the mainland coast there are around 822 beaches[4]. The coastline is, with the exception of Darwin and it's immediate environs, remote and inaccessible. Approximately 80 per cent of the coastline is held in Aboriginal Land Trusts and eight per cent is held in conservation tenure including the Kakadu and Gurig National Parks.

Network members returned 10 surveys: eight for beach areas in the immediate vicinity of Darwin; one for Milingimbi Beach on Milingimbi Island; and one group survey for beach areas on North Island of the Sir Edward Pellew Group.

According to network members, six of the 10 beach areas surveyed are without dunes. Where dunes exist they are generally moderate in size averaging two to three metres in height and 10 to 50 metres in width. Network members identified exotic and other non-native flora at two of the beach areas surveyed. Species identified include Tamarinda and some introduced grass species.

According to network members all of the beach areas surveyed except Lee Point and North Island have property and/or infrastructure development within 250 metres of the high tide mark.

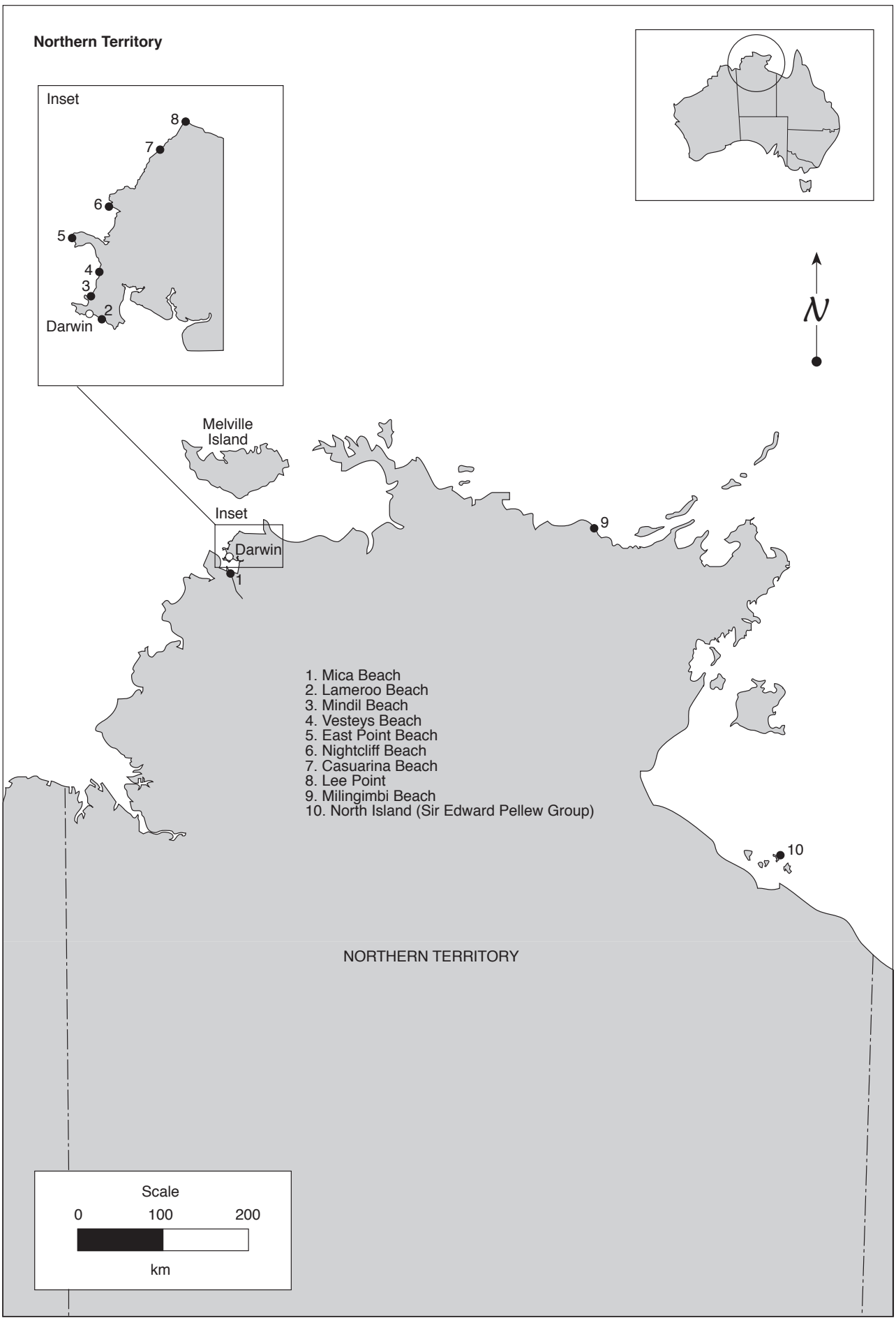
Network members identified stormwater outlet pipes at four of the beach areas surveyed.

Network members identified three public sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Larrakeyah, Ludmilla and Millingimbi and discharge primary treated effluent to the ocean. The outfalls service, by east coast standards, relatively small populations and have a combined discharge of approximately 7.5 million litres per day.

Public access to the beach areas surveyed is, in the main, unrestricted although Milingimbi Island requires a permit from the Arnhem Land Aboriginal Land Trust.

According to network members, litter is the biggest problems affecting beach areas including that washed ashore from fishing trawlers, recreational boats and shipping. Network members note a high incidence of fishing related debris including discarded nets and fishing line.

Northern Territory



3.2 Queensland

Queensland has a coastline, including major islands, of approximately 9800 kilometres[14]. Along the mainland coast there are around 1465 beaches[4]. The survey targeted all areas of the mainland and Magnetic, South Keppel, Fraser, Moreton, Bribie, North Stradbroke and South Stradbroke Islands.

Network members returned 265 surveys providing data on 185 mainland beach areas and 80 island beach areas. Of the surveys, 246 are for individual beaches, seven are for groups of two or more beaches, and 12 are for sections of coastline between two geographic points.

According to network members, 84 (32 per cent) of the beach areas surveyed are without dunes including 28 that have lost their dunal system to urban development. This figure does not include beaches on the Gold Coast or in other areas where development compromises, but does not replace entirely, the dunal system of adjacent beaches. Network members identified exotic and other non-native flora at 124 (47 per cent) of the beach areas surveyed. Species identified are mainly common knowledge species like Lantana, Bouganvillea and Rubbervine. Other species identified include Indian Almond, Mossman River Burr, Groundsel, Palm Trees and Norfolk Island Pines.

According to network members, 112 (42 per cent) of the beach areas surveyed are located in urban areas and 205 (77 per cent) have property and/or infrastructure development within 250 metres of the high tide mark.

Network members identified stormwater outlet pipes at 68 (26 per cent) of the beach areas surveyed, 41 of which had litter in the vicinity of pipe discharge at the time of survey. The four most common litter categories evident were cans (59 per cent), cigarette butts (56 per cent), food wrappers (56 per cent) and plastic bags (56 per cent).

Network members identified 33 public sewerage outfalls discharging in the vicinity of beach areas surveyed: 22 discharge to estuaries and 11 discharge to the ocean. Treatment standards are secondary standard or better at all but one of these and effluent re-use occurs from 12 of the systems. The outfalls have a combined discharge of approximately 800 million litres per day.

Network members listed 83 water courses including 17 rivers and 55 creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff (66 per cent), agricultural runoff (52 per cent) and litter/debris (51 per cent).

There was litter evident at 75 per cent of the beach areas surveyed. The four most common litter categories evident were flotsam/jetsam (74 per cent), cans (70 per cent), PET/plastic bottles (64 per cent) and plastic bags (61 per cent).

Network members identified mining operations at five (two per cent) of the beach areas surveyed including four sandmines and one dredging operation.

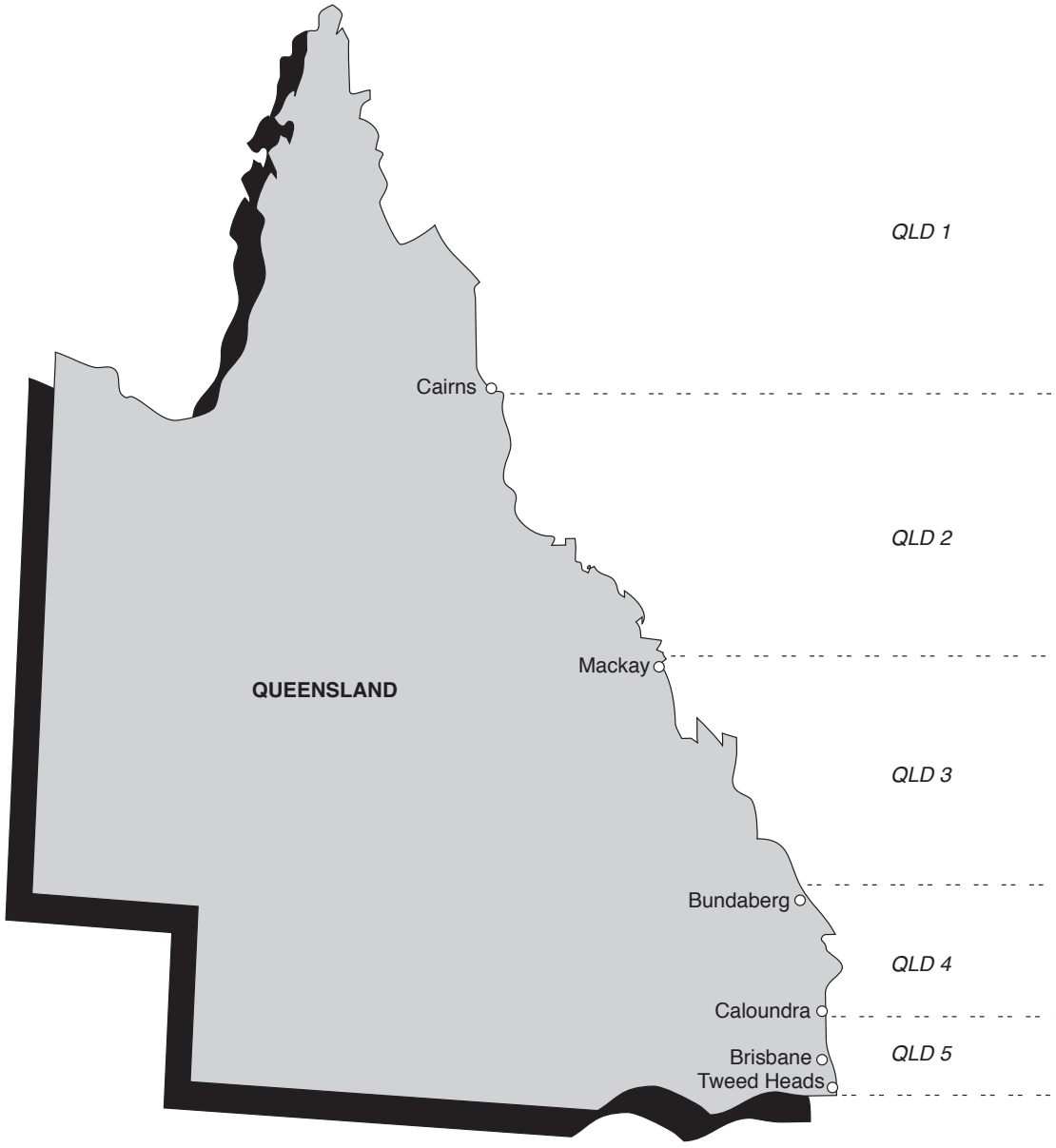
Network members identified development proposals affecting 64 (24 per cent) of the beach areas surveyed including 25 involving housing development and 18 involving resort development.

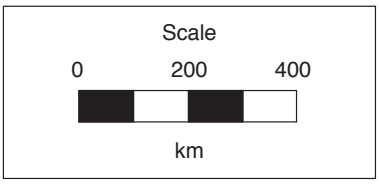
Public access to beach areas surveyed is, in the main, unrestricted, although network members note 23 beach areas where private property hinders access. A further eight beach areas are closed to the public, six for defence purposes and two because of private property.

Network members use additional comments to highlight a number of issues and these are covered in the regional summaries.

Queensland coastal regions

QLD 1. NT border to Cape Grafton
QLD2. Cape Grafton to Slade Point
QLD 3. Slade Point to Baffle Creek
QLD 4. Baffle Creek to Caloundra
QLD 5. Caloundra to NSW border





Islands of the Torres Strait

Lengh of Coastline: Unknown

Number of Surveys: 3

Coverage: Poor

The islands and islets of the Torres Strait number around 70 and represent the high points of a land bridge that once connected Australia and New Guinea more than 10,000 years ago. Most of these islands are now reserved for the indigenous population and many are uninhabitated due to a lack of fresh water. Non-reserve territories include Thursday Island, Horn Island, Prince of Wales Island and Friday Island. Thursday Island has a community port supplying general cargo, petrol and diesel to Torres Strait communities. As with all ports there are environmental risks associated with shipping movements including general waste, cargo spillage, and ballast discharge.

Network members returned three surveys: one each for beach areas on Thursday Island and Tuesday Island, and one for Muralug Beach on Prince of Wales Island.

According to network members, all three of the beach areas surveyed are without dunes. Dunal systems are, in fact, a rare occurance on Torres Strait beaches because the shallow continental shelf dissipates wave energy and, therefore, sand movement into the region.

Thursday Island and Muralug beaches have property and infrastructure development within 50 metres of the high tide mark and there is a stormwater outlet that discharges to the beach on Thursday Island. Litter categories evident in the vicinity of pipe discharge at the time of survey include plastic bags and styrofoam packaging.

According to network members the community on Thursday Island discharge septic effluent and hospital waste into the Torres Strait. It is not known how sewage is managed on the other two islands.

According to network members, litter is the biggest problem affecting beach areas in the region.

•••• sparsely populated: low impacts; untouched in parts

Northern Territory Border to Cape Grafton

Length of Coastline: 2100km (approximate estimate)

Number of Surveys: 28

Coverage: Poor

The Northern Territory Border to Cape Grafton is a remote and sparsely populated coastline, 30 per cent of which is held in Aboriginal land holdings. Conservation reserves protect approximately seven per cent of the coastline and include the Jardine River, Iron Range, Lakefield, Cape Melville, Endeavour River, Cedar Bay and Cape Tribulation National Parks. During the wet season (November to May) Cape York is virtually cut off from vehicular access. Coastal settlements include Burketown, Karumba, Weipa, Cooktown, Port Douglas and Cairns.

Network members returned 28 surveys, all of which are for beach areas between Cape Tribulation and Cairns including six within the Cape Tribulation National Park. Lengths of beach areas surveyed range from 500 metres to 10 kilometres.

According to network members, 19 of the beach areas surveyed are without dunes including seven that have lost their dunal system to urban development. Where dunes exist they are generally small in size averaging one to five metres in height and two to 10 metres in width. Network members identified exotic and other non-native flora at 14 of the beach areas surveyed including Coconut Palms, Goats Foot, She Oak, Indian Almond and Cacti.

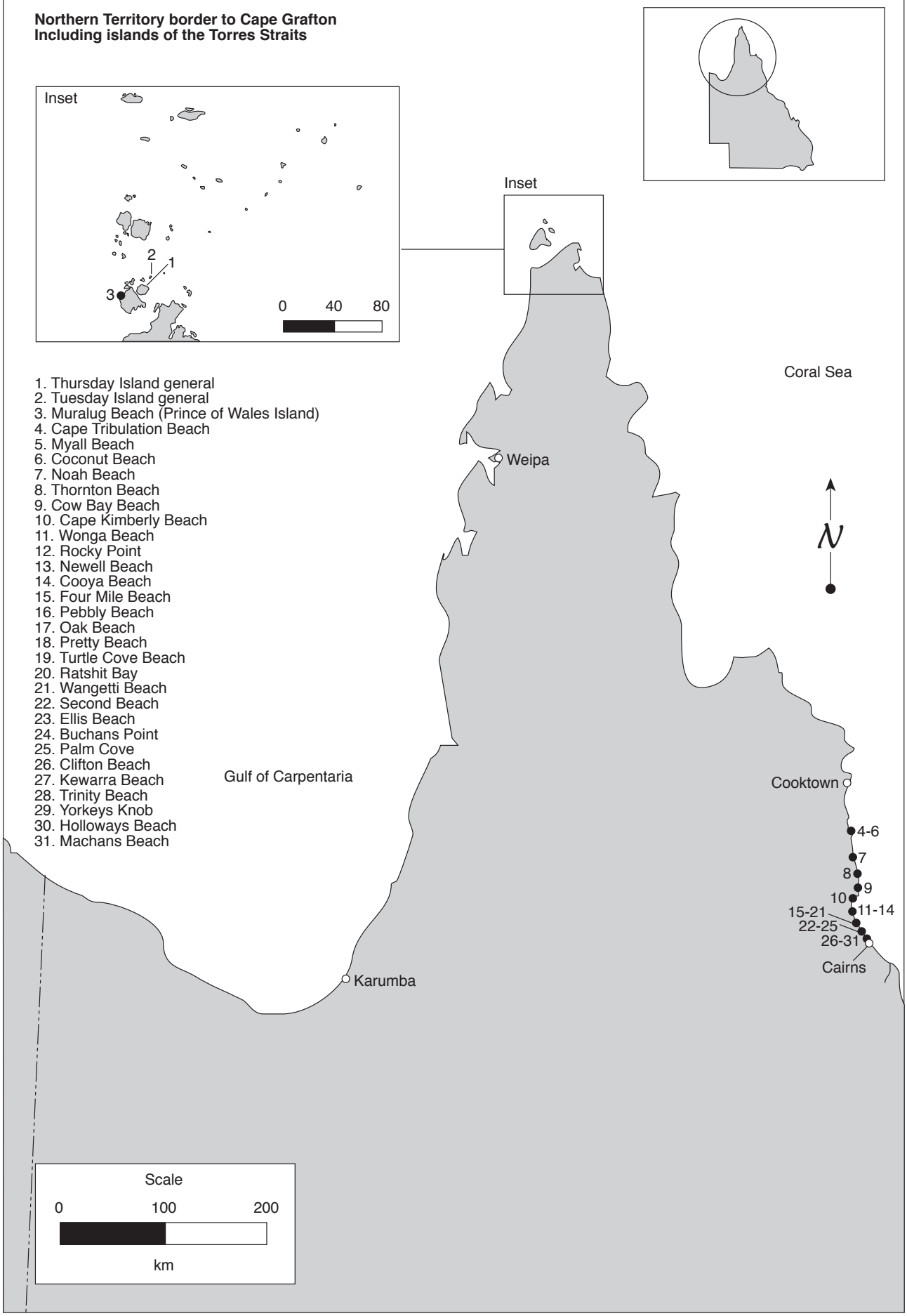
According to network members, 11 of the beach areas surveyed are located in urban areas and a further 17 have property and/or infrastructure development within 250 metres of the high tide mark. This development infringes to within 50 metres of the high tide mark at nine of the beach areas surveyed. Network members identified stormwater outlet pipes at two of the beach areas surveyed, neither of which had litter evident in the vicinity of pipe discharge at the time of survey.

Network members identified three sewerage outfalls discharging in the vicinity of beach areas surveyed. These outfalls are located at Mossman and Cairns and discharge secondary treated effluent to estuarine environments.

Network members listed three rivers as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff, sewage, septic leachate, litter and debris.

Public access to beach areas surveyed is, in the main, unrestricted although network members note two beach areas where access is hindered by private property. In addition, Turtle Cove Beach is, according to network members, closed to the public because of private property.

Northern Territory border to Cape Grafton
Including islands of the Torres Straits



1. Thursday Island general
2. Tuesday Island general
3. Muralug Beach (Prince of Wales Island)
4. Cape Tribulation Beach
5. Myall Beach
6. Coconut Beach
7. Noah Beach
8. Thornton Beach
9. Cow Bay Beach
10. Cape Kimberly Beach
11. Wonga Beach
12. Rocky Point
13. Newell Beach
14. Cooya Beach
15. Four Mile Beach
16. Pebbly Beach
17. Oak Beach
18. Pretty Beach
19. Turtle Cove Beach
20. Ratshit Bay
21. Wangetti Beach
22. Second Beach
23. Ellis Beach
24. Buchans Point
25. Palm Cove
26. Clifton Beach
27. Kewarra Beach
28. Trinity Beach
29. Yorkeys Knob
30. Holloways Beach
31. Machans Beach

Network members identified development proposals affecting three of the beach areas surveyed including two involving resort development and one involving housing development.

Network members use additional comments to highlight a number of issues including the impacts of increasing levels of tourism and development between Cooktown and Cairns.

•••• sparsely populated: generally low impacts, moderate in places

Cape Grafton to Slade Point

Length of Coastline: 700km (approximate estimate)

Number of Surveys: 4

Coverage: Reasonable

Cape Grafton to Slade Point is a busy stretch of coastline that takes in the city of Townsville and numerous other coastal settlements including Flying Fish Point, Mission Beach, Cardwell, Lucinda, and Bowen. There are nine national parks on the mainland coast and another five protecting offshore islands.

Network members returned 44 surveys providing reasonable coverage throughout the region. Of the surveys, all but one are for individual beaches, the exception is a group survey taking in Rose Bay, Murrays Bay, Horseshoe Bay and Gregs Bay. Beach areas surveyed range in length from 200 metres to 30 kilometres.

According to network members, nine of the beach areas surveyed are without dunes including one area that has lost its dunal system to urban devlopment. Where dunes exist they are generally small in size averaging two to five metres in height and five to 50 metres in width, although dunes as wide as 500 metres occur in some locations. Network members identified exotic and other non-native flora at 20 of the beach areas surveyed including Coconut Trees, Rubbervine, exotic grasses and weeds.

According to network members, 20 of the beach areas surveyed are located in urban areas and a further 19 have property and/or infrastructure development within 250m of the high tide mark. Network members identified stormwater outlet pipes at 13 of the beach areas surveyed, four of which had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter categories evident were plastic bags and cans.

Network members identified six sewerage outfalls discharging in the vicinity of beach areas surveyed. Of these, four discharge to the ocean, and two to estuaries. All six outfalls discharge secondary treated effluent and there is effluent re-use from two of the systems.

Network members listed three rivers and 23 creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff, sewage, industrial effluent, litter and debris.

Public access to beach areas surveyed is, in the main, unrestricted although Rowes Bay is closed as part of a defence reserve and network members note that access to both Balgal Beach and Hideaway Bay is hindered by private property.

Network members identified development proposals affecting 11 of the beach areas surveyed, including eight involving housing development and seven involving resort development.

Network members use additional comments to highlight a number of issues including the impacts on dunal areas of beach front property development, pedestrian traffic and four wheel drives and the need to preserve areas of high conservation value, for example, Cassowary habitats at Garners Beach and other areas.

••• moderately populated: generally low impacts; moderate in parts

Magnetic Island

Length of Coastline: 30 kilometres (approximate estimate)

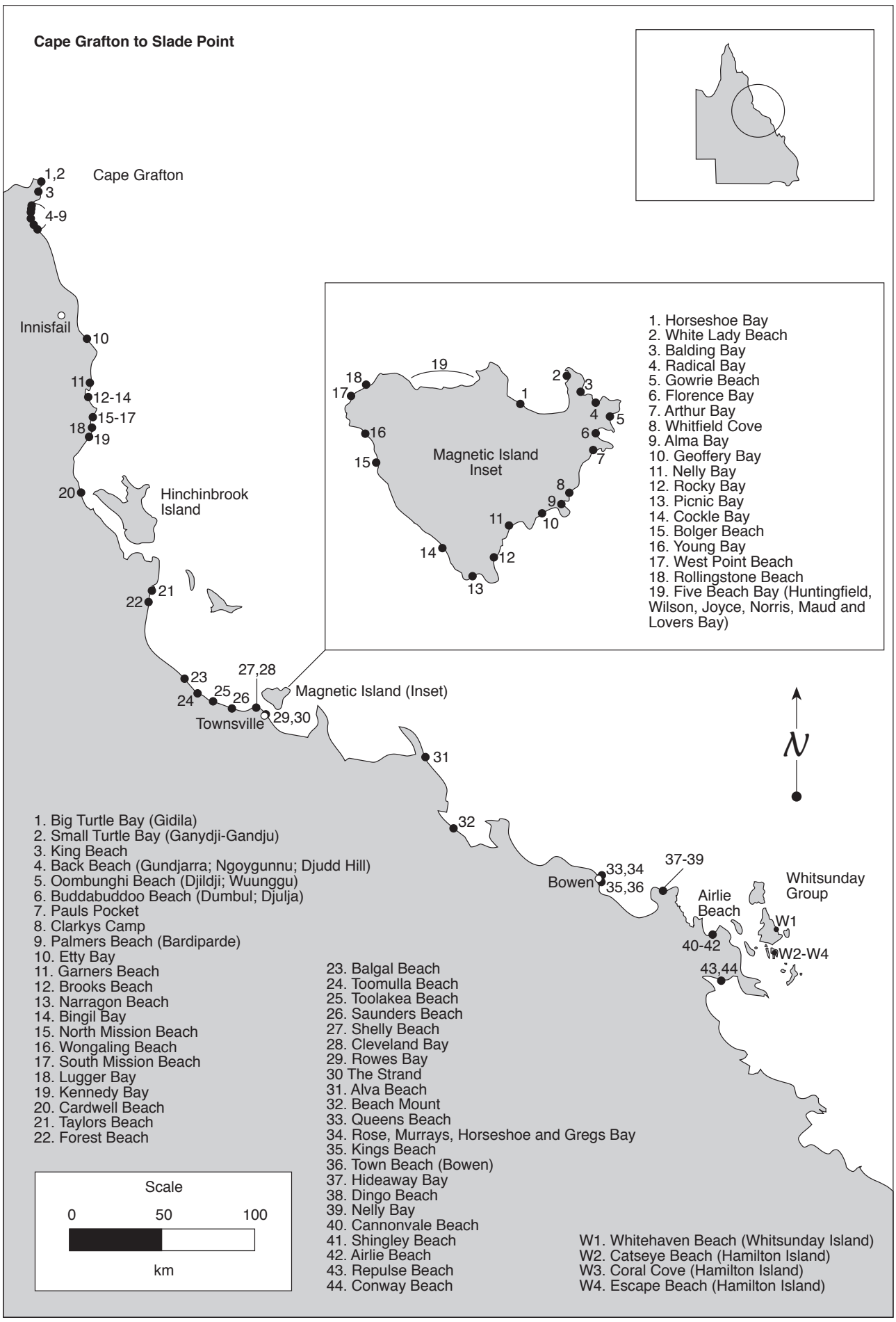
Number of Surveys: 19

Coverage: Excellent

Magnetic Island is located approximately eight kilometres east of Townsville and has a small resident population located in settlements along the east coast including Picnic Bay, Nelly Bay, Arcadia and Horseshoe Bay. Elsewhere the island is protected by National Park and has retained it's rugged natural environment.

Network members returned 19 surveys providing excellent coverage of the island. All but one of the surveys are for individual beaches, the exception is a group survey taking in Five Beach Bay. Lengths of beach areas surveyed range from 100 metres to three kilometres.

According to network members, 14 of the beach areas surveyed are without dunes including two that have lost their dunal system to urban development. Where dunes exist they are relatively moderate in size with heights to 10 metres and widths averaging around 100 metres, but up to 200 metres in places. Network members identified non-native flora at five of the beach areas surveyed including Coconut Palms, Dated Palms, Tacoma, Guinea grass, Natal grass, Madarcar Periwinkle, Goats Head Burr, and Lantana.


Cape Grafton to Slade Point
1,2
Cape Grafton
3
4-9
Innisfail
10
11
12-14
15-17
18
19
20
Hinchinbrook Island
21
22
23
24
25
26
27,28
29,30
Townsville
Magnetic Island (Inset)
31
32
33,34
35,36
Bowen
37-39
Airlie Beach
40-42
43,44
Whitsunday Group
W1
W2-W4
Magnetic Island Inset
1. Horseshoe Bay
2. White Lady Beach
3. Balding Bay
4. Radical Bay
5. Gowrie Beach
6. Florence Bay
7. Arthur Bay
8. Whitfield Cove
9. Alma Bay
10. Geoffery Bay
11. Nelly Bay
12. Rocky Bay
13. Picnic Bay
14. Cockle Bay
15. Bolger Beach
16. Young Bay
17. West Point Beach
18. Rollingstone Beach
19. Five Beach Bay (Huntingfield, Wilson, Joyce, Norris, Maud and Lovers Bay)
1. Big Turtle Bay (Gidila)
2. Small Turtle Bay (Ganydji-Gandju)
3. King Beach
4. Back Beach (Gundjarra; Ngoygunnu; Djudd Hill)
5. Oombunghi Beach (Djildji; Wuunggu)
6. Buddabuddoo Beach (Dumbul; Djulja)
7. Pauls Pocket
8. Clarkys Camp
9. Palmers Beach (Bardiparde)
10. Etty Bay
11. Garners Beach
12. Brooks Beach
13. Narragon Beach
14. Bingil Bay
15. North Mission Beach
16. Wongaling Beach
17. South Mission Beach
18. Lugger Bay
19. Kennedy Bay
20. Cardwell Beach
21. Taylors Beach
22. Forest Beach
23. Balgal Beach
24. Toomulla Beach
25. Toolakea Beach
26. Saunders Beach
27. Shelly Beach
28. Cleveland Bay
29. Rowes Bay
30 The Strand
31. Alva Beach
32. Beach Mount
33. Queens Beach
34. Rose, Murrays, Horseshoe and Gregs Bay
35. Kings Beach
36. Town Beach (Bowen)
37. Hideaway Bay
38. Dingo Beach
39. Nelly Bay
40. Cannonvale Beach
41. Shingley Beach
42. Airlie Beach
43. Repulse Beach
44. Conway Beach
W1. Whitehaven Beach (Whitsunday Island)
W2. Catseye Beach (Hamilton Island)
W3. Coral Cove (Hamilton Island)
W4. Escape Beach (Hamilton Island)
Scale
0
50
100
km

Magnetic Island National Park takes in ten of the beach areas surveyed including Five Beach Bay and Florence Bay. In addition there are foreshore reserves at Horseshoe Bay and Geoffery Bay.

According to network members, five of the beach areas surveyed are located in urban areas and, in places, development often infringes to within 50 metres of the high tide mark. A further seven beach areas have property and/or infrastrucuture development within 100 metres of the high tide mark. Network members identified stormwater outlet pipes at Geoffery Bay, Nelly Bay and Picnic Bay, only one of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include food wrappers and plastic bags.

A small sewage treatment plant is located at Nelly Bay and discharges secondary treated effluent into Gastar Creek. The rest of the island remains on septic and network members note problems with seepage from poorly maintained septics at Geoffery Bay and Picnic Bay.

Public access to beach areas surveyed is, in the main, unrestricted, although network members note access to parts of both White Lady Beach and Nelly Bay is hindered by private property.

Network members identified development proposals affecting five of the beach areas surveyed including two involving housing development and two involving resort development.

Network members use additional comments to highlight a number of issues including: litter from both onshore and offshore sources; the impacts of ongoing and often inappropriate development; and the impacts of dredging on the marine environment of the Platypus Channel.

•••• national park island with a small resident population: some impacts associated with residential and commercial developments

Whitsunday Group

Length of Coastline: Not known

Number of Surveys: 4

Coverage: Poor

The Whitsunday Group of Islands are located between two and 20 kilometres east of Shutehaven and include the resort islands of Hayman, Whitsunday, Hamilton, Long, South Molle and West Molle. Many of the islands are protected by national park.

Network members returned four surveys: three for individual beaches on Hamilton Island and one for Whitehaven Beach on Whitsunday Island.

All four beaches have relatively small dunal buffer zones averaging two to six metres in height and five to 15 metres in width. The only beach area where network members identified exotic and other non-native flora species is Catseye Beach which is said to have a variety of introduced species including Coconut Palms.

The resort on Hamilton Island has a small sewage treatment flora that treats effluent to a tertiary standard and re-uses approximately 80 per cent for irrigation purposes. The remaining 20 per cent is discharged to the ocean via an outfall on the south side of the island.

Public access to beach areas surveyed is unrestricted and the beaches are frequented by day-trippers as well as resort patrons. According to network members the beaches are generally litter free, although there was some litter evident at the time of survey including aluminium cans, cigarette butts and plastic bags.

According to network members, many locals including the indigenous population are concerned about the impacts of a proposal to increase aircraft access to Whitehaven Beach. Other concerns include the impacts of pedestrian traffic on dunal areas and the discharge of raw sewage from boats without holding tanks.

•••• national park and resort islands with increasing levels of recreational use: generally low impacts

Slade Point to Baffle Creek

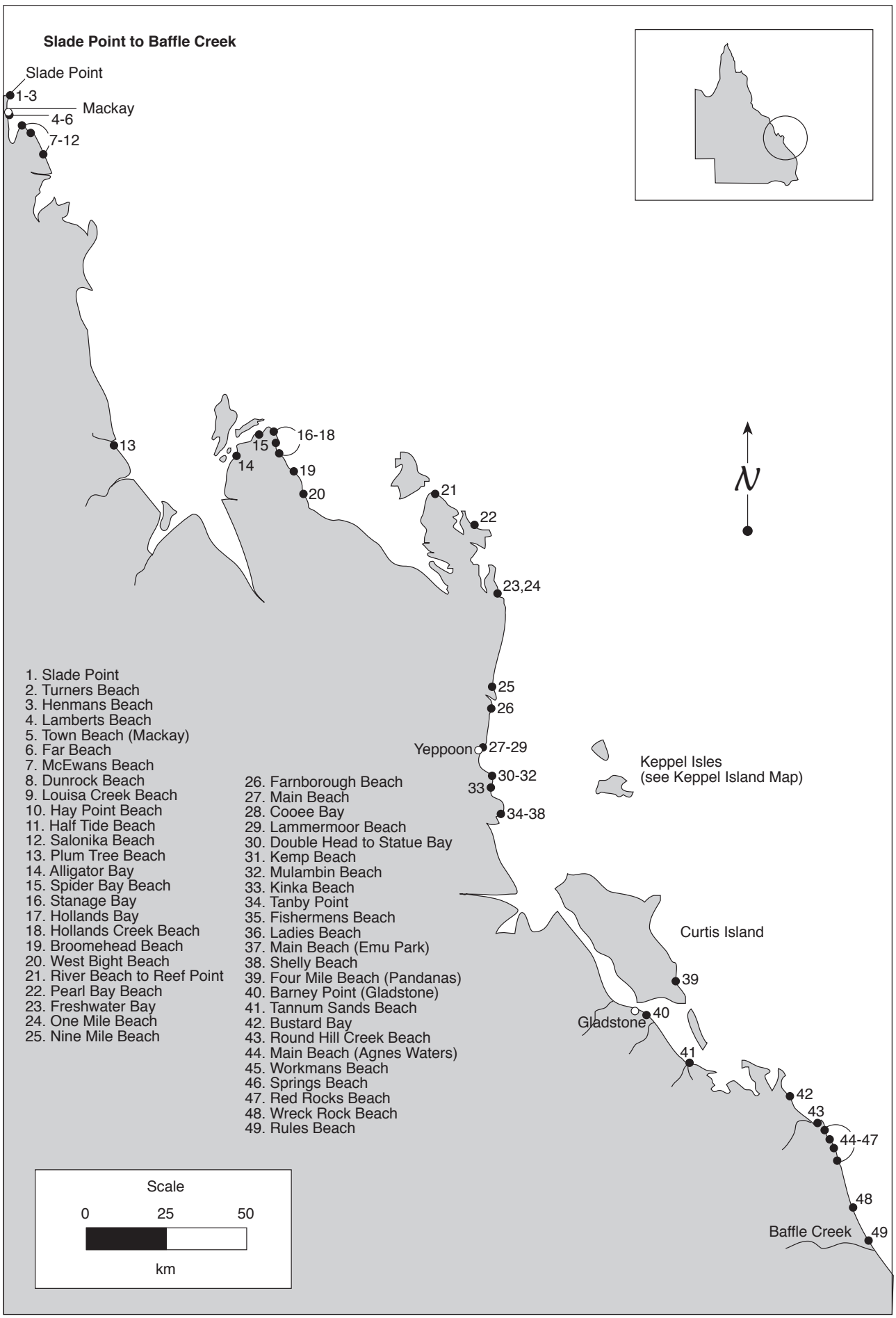
Length of Coastline: 750km (approximate estimate)

Number of Surveys: 49

Coverage: Reasonable

Slade Point to Baffle Creek is a moderately populated coastline that takes in the urban centres of Mackay, Rockhampton and Gladstone. Other coastal settlements including Bucasia, Half Tide, Grasstree, Yeppoon, Emu Park, and Tannum Sands. Gladstone is a major industrial centre whose sheltered harbour is, in terms of tonnage handled, Queensland's leading port handling coal, bauxite, alumina, and aluminium. A second coal port is located at Hay Point approximately 100kms south of Mackay. There are a number of small national parks including Cape Palmerston, West Hill, Byfield, Eurimbula and Deepwater. In addition to these the Shoalwater Bay Defence Reserve protects approximately 200,000 hectares of coastal wilderness.

Network members returned 49 surveys providing reasonable coverage throughout the region. Of the surveys, 47 are for individual beaches and two are section surveys covering River Beach to Reef Point and Double Head to Statue Bay. Lengths of beach areas surveyed range from 200 metres to 25 kilometres.


Slade Point to Baffle Creek
Slade Point
1-3
Mackay
4-6
7-12
13
14
15
16-18
19
20
21
22
23,24
25
26
Yeppoon
27-29
30-32
33
34-38
Keppel Isles
(see Keppel Island Map)
Curtis Island
39
Gladstone
40
41
42
43
44-47
48
Baffle Creek
49
N
1. Slade Point
2. Turners Beach
3. Henmans Beach
4. Lamberts Beach
5. Town Beach (Mackay)
6. Far Beach
7. McEwans Beach
8. Dunrock Beach
9. Louisa Creek Beach
10. Hay Point Beach
11. Half Tide Beach
12. Salonika Beach
13. Plum Tree Beach
14. Alligator Bay
15. Spider Bay Beach
16. Stanage Bay
17. Hollands Bay
18. Hollands Creek Beach
19. Broomehead Beach
20. West Bight Beach
21. River Beach to Reef Point
22. Pearl Bay Beach
23. Freshwater Bay
24. One Mile Beach
25. Nine Mile Beach
26. Farnborough Beach
27. Main Beach
28. Cooee Bay
29. Lammermoor Beach
30. Double Head to Statue Bay
31. Kemp Beach
32. Mulambin Beach
33. Kinka Beach
34. Tanby Point
35. Fishermens Beach
36. Ladies Beach
37. Main Beach (Emu Park)
38. Shelly Beach
39. Four Mile Beach (Pandanas)
40. Barney Point (Gladstone)
41. Tannum Sands Beach
42. Bustard Bay
43. Round Hill Creek Beach
44. Main Beach (Agnes Waters)
45. Workmans Beach
46. Springs Beach
47. Red Rocks Beach
48. Wreck Rock Beach
49. Rules Beach
Scale
0
25
50
km

According to network members, nine of the beach areas surveyed are without dunes including one that has lost its dunal system to urban development. Where dunes exist they are generally moderate in size, averaging two to 10 metres in height and 10 to 50 metres in width. However, some dunal areas between Shoalwater Bay and Yeppoon are much larger in size. The largest dunes recorded by network members are located at Pearl Bay Beach and are said to up be 120 metres high and 8000 metres wide. Network members identified exotic and other non-native flora at 15 of the beach areas surveyed. Species identified include Prickley Pear, Bouganvillea, and Lantana.

According to network members, 15 of the beach areas surveyed are located in urban areas and a further 13 have property or infrastucture development within 250 metres of the high tide mark. Where development occurs it often infringes to within 100 metres of the high tide mark. Network members identified stormwater outlet pipes at 10 of the beach areas surveyed, eight of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include cigarette butts, cans, and PET/plastic bottles.

Network members identified seven public sewerage outfalls discharging in the vicinity of beach areas surveyed. All seven outfalls discharge secondary treated effluent or better: six discharge to estuaries and one to the ocean.

Network members identified two rivers and seven creeks as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff, urban runoff, industrial effluent and sewage.

Public access to beach areas surveyed is, in the main, unrestricted although beach areas inside the Shoalwater Bay Defence Reserve are closed to the public. In addition, network members note four beach areas where access is hindered by beach front property.

Network members identified development proposals affecting four of the beach areas surveyed, including two involving resort development. Other development proposals include an expansion to the Dalrymple Bay Coal Terminal at Hay Point.

Network members use additional comments to highlight a number of issues including the impacts of pedestrian traffic and four wheel drives on dunal areas and habitat loss associated with new developments.

••• moderately populated: generally low impacts; moderate to high in places

South (Great) Keppel Island

Length of Coastline: 43km (approximate estimate)

Number of Surveys: 17

Coverage: Excellent

South Keppel Island is located approximately 20 kilometres east of Yeppoon and has a popular resort adjacent to Fishermans Beach on the east coast. Most of the island is held in special lease, the rest is either un-allocated crown land, or freehold/perpetual lease.

Network members returned 17 surveys providing excellent coverage of the island. All of the surveys are for individual beaches. Lengths of beach areas surveyed range from 100 metres to two kilometres.

All but five of the beach areas surveyed have dunal systems. Dunes are moderate in size with heights to six metres and widths to 20 metres. Network members identified exotic and other non-native flora at seven of the beach areas surveyed. Species identified include Lantana, Prickly Pear and Oleander.

Apart from the resort and the associated airstrip and golf course there is very little in the way of development on the island. A small camping ground is located just north of the resort, and a homestead dating back to the 19th century is located inland from Leekes Beach. In addition there is a house on private property adjacent to Svendsens Beach.

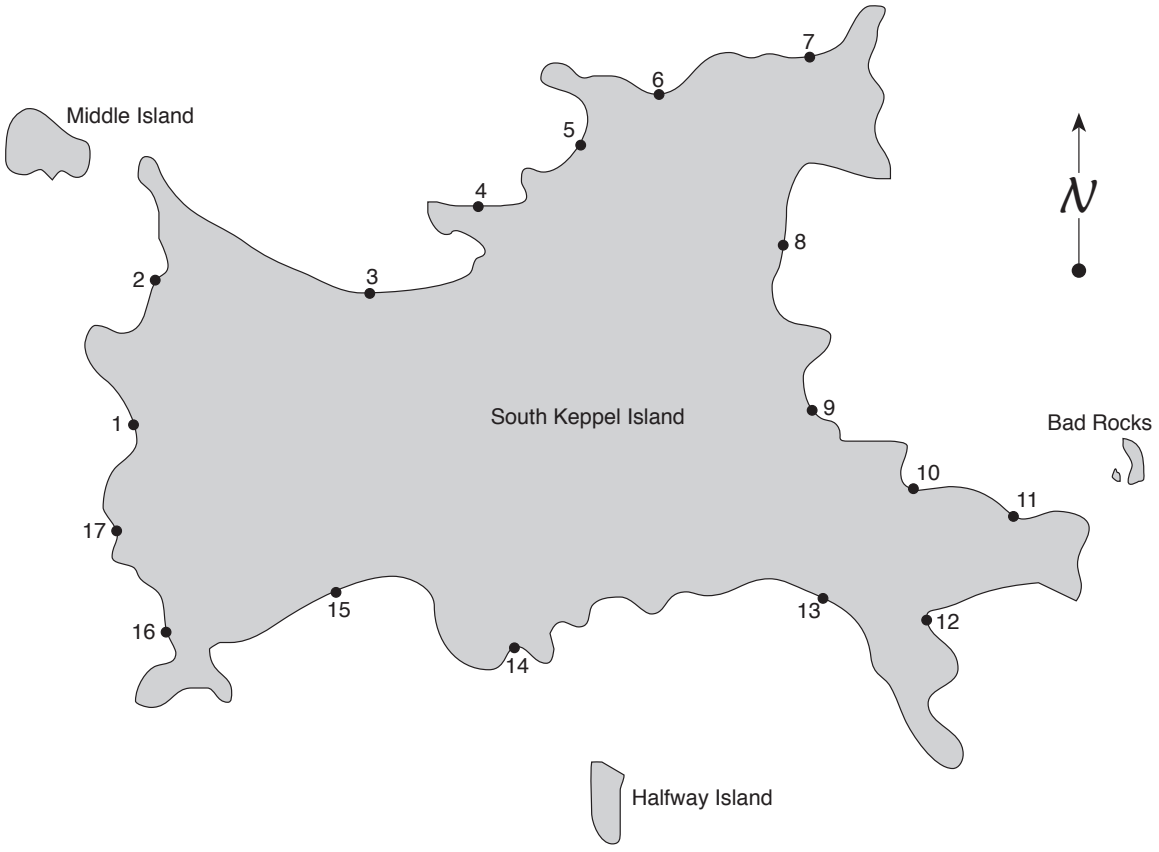
The resort has a small sewerage treatment plant that services approximately one-third of it's accomodation. Effluent is treated to a secondary standard before discharge to the ocean at Putney Point. The remaining two-thirds of the resort's accomodation is serviced by septic tanks that discharge, via a pump, to a soakage area approximately 250 metres inland from Putney Beach.

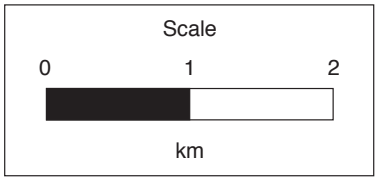
According to network members, beach areas are generally free of litter, although there was some litter evident at the time of survey including cans, plastic bags and food wrappers. Network members indicate that litter from offshore sources, predominately fishing boats and recreational vessels, can be a problem.

•••• resort island: low impacts

South Keppel Island

1. Fishermans Beach
2. Putney Beach
3. Leekes Beach
4. Second Beach
5. Svenden Beach
6. Butterfish Bay
7. Billy Goat Bay
8. Wreck Beach
9. 2nd Wreck Beach
10. Watsons Beach
11. Lighthouse Beach
12. Red Beach
13. Clam Bay Beach
14. Wydham Cove
15. Long Beach
16. Monkey Beach
17. Shelving (Honeymoon) Beach





Baffle Creek to Caloundra

Length of Coastline: 300km (approximate estimate)

Number of Surveys: 39

Coverage: Good

Baffle Creek to Caloundra takes in the sparsely populated coastline between Bundaberg and Rainbow Beach and the much more densely populated Sunshine Coast between Noosa Heads and Caloundra. Coastal settlements include Burnett Heads, Bargara, Elliot Heads, Woodgate, Burrum Heads, Hervey Bay, Noosa Heads, Maroochydore and Caloundra. Conservation reserves include the Kinkuna, Cooloola and Noosa Heads national parks.

In total there were 39 surveys returned providing good coverage of the Bundaburg and Sunshine Coasts but missing out on the Hervey Bay and Maryborough districts. As such there is no data on beaches adjacent to, or impacts associated with, the townships of Hervey Bay, Maroom, Tuan and Tin Can Bay. Lengths of beach areas surveyed range from 400 metres to 15 kilometres.

According to network members, all but two of the beach areas surveyed have well established dunal systems with heights ranging from two to 40 metres, and widths from 10 to 200 metres. Network members identified exotic and other non-native flora at 32 of the 39 beaches including Prickly Pear, Saratio, Mossman River Burr, Protospargus and Lantana.

According to network members, 29 of the beach areas surveyed are located in urban areas and 34 have property and/or infrastructure development within 250 metres of the high tide mark. Where property development occurs it often infringes to within 50 metres of the high tide mark. On the Sunshine Coast there is also a high incidence of medium to high density development within 250m of the high tide mark. Network members identified stormwater outlet pipes at 17 of the beach areas surveyed, 16 of which had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter categories found were plastic bags, cigarette butts and food wrappers.

Network members identified five public sewerage outfalls discharging in the vicinity of beach areas surveyed: two discharge to the ocean and three to estuaries. Treatment standards are secondary or better and there is some, albeit small quantities, of effluent re-use associated with two of these systems.

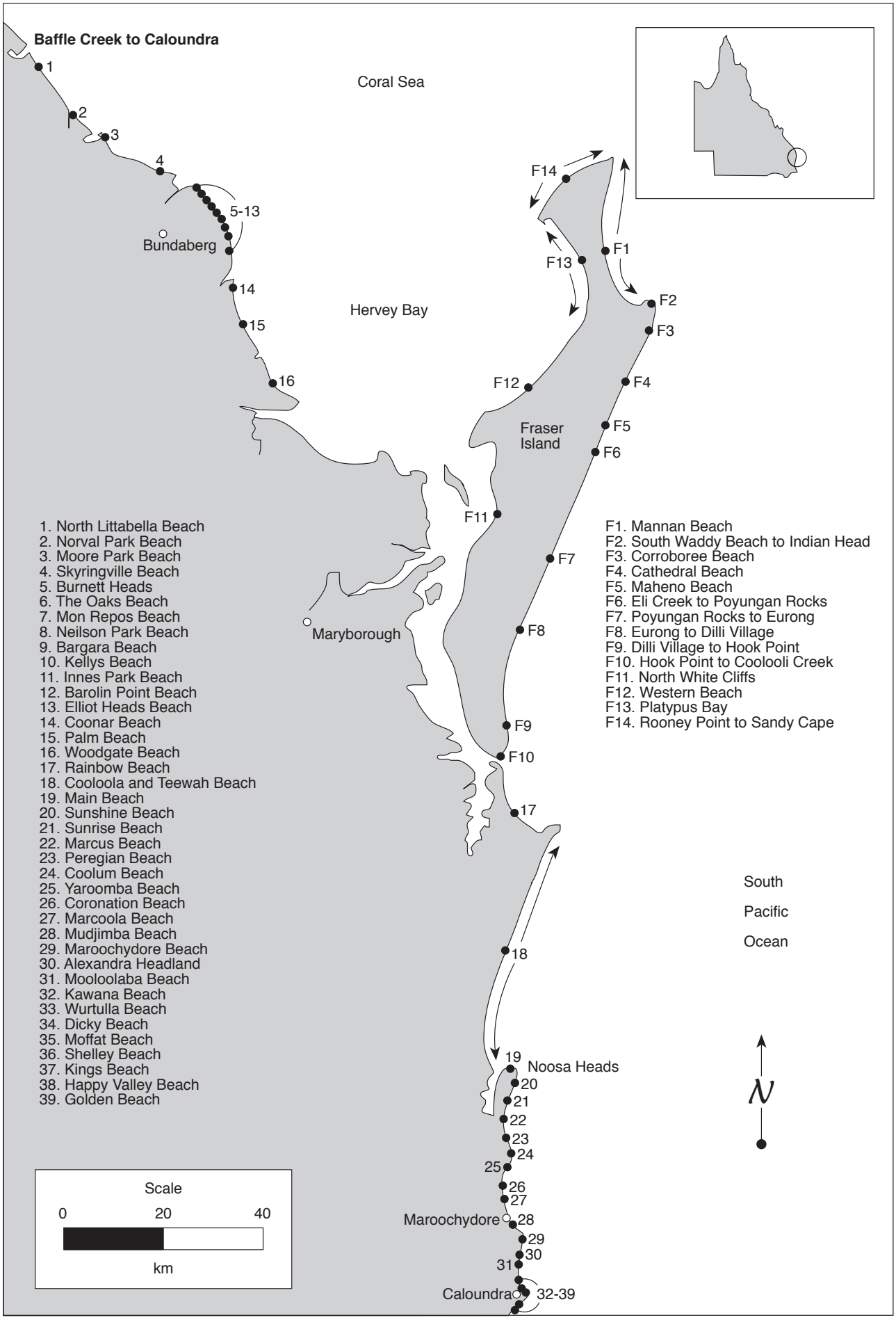
Network members identified seven rivers and 13 creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff, litter, debris, sewage and industrial effluent. The Burnett River in particular was singled out by network members as being heavily compromised by a wide variety of pollution sources including large quantities of litter and debris.

Public access to the beach areas surveyed is, in the main, unrestricted, although network members note four beach areas where restrictions occur, three because of private property and one for conservation purposes.

Network members identified development proposals affecting 11 of the beach areas surveyed, including five involving housing development and three involving resort development.

Network members use additional comments to highlight a number of issues including the impacts of beach-front property development; four wheel drives on dunal areas; declining water quality of rivers and creeks; and litter from both onshore and offshore sources.

••• moderately populated: high impacts in parts


Baffle Creek to Caloundra
Coral Sea
Hervey Bay
Fraser Island
Bundaberg
Maryborough
Noosa Heads
Maroochydore
Caloundra
South Pacific Ocean
1. North Littabella Beach
2. Norval Park Beach
3. Moore Park Beach
4. Skyringville Beach
5. Burnett Heads
6. The Oaks Beach
7. Mon Repos Beach
8. Neilson Park Beach
9. Bargara Beach
10. Kellys Beach
11. Innes Park Beach
12. Barolin Point Beach
13. Elliot Heads Beach
14. Coonar Beach
15. Palm Beach
16. Woodgate Beach
17. Rainbow Beach
18. Cooloola and Teewah Beach
19. Main Beach
20. Sunshine Beach
21. Sunrise Beach
22. Marcus Beach
23. Peregian Beach
24. Coolum Beach
25. Yaroomba Beach
26. Coronation Beach
27. Marcoola Beach
28. Mudjimba Beach
29. Maroochydore Beach
30. Alexandra Headland
31. Mooloolaba Beach
32. Kawana Beach
33. Wurtulla Beach
34. Dicky Beach
35. Moffat Beach
36. Shelley Beach
37. Kings Beach
38. Happy Valley Beach
39. Golden Beach
F1. Mannan Beach
F2. South Waddy Beach to Indian Head
F3. Corroboree Beach
F4. Cathedral Beach
F5. Maheno Beach
F6. Eli Creek to Poyungan Rocks
F7. Poyungan Rocks to Eurong
F8. Eurong to Dilli Village
F9. Dilli Village to Hook Point
F10. Hook Point to Coolooli Creek
F11. North White Cliffs
F12. Western Beach
F13. Platypus Bay
F14. Rooney Point to Sandy Cape
Scale
0 20 40
km
N

Fraser Island

Length of Coastline: 300 km (approximate estimate)

Number of Surveys: 14

Coverage: Very good

Fraser Island, the largest sand island in the world, has been formed by the continuous deposition of sand transported north by ocean currents from as far south as Sydney. The exposed east and northern sides of the island have long continuous open beaches. The western side on the other hand is dominated by mangroves and mud flats. The island is, with the exception of some small outcrops of volcanic rock, made up almost entirely of sand, piled as high as 200 metres in places and richly vegetated with pockets of rainforest. There are a number of resorts, holiday cabins and camping grounds and these are serviced by a small resident population. Fraser Island is a World Heritage Area, was the first item listed on Australia's National Estate and has the Great Sandy Islands National Park protecting approximately 140,000 hectares of bushland on the northern half of the island. Much of the rest of the island is vacant crown land proposed for national park pending resolution of Aboriginal land interests.

Network members returned 14 surveys: seven are for individual beaches and seven are section surveys covering the east coast beach. Lengths of beach areas surveyed range from five kilometres to 35 kilometres.

All but one of the beach areas surveyed have well vegetated dunes. The exception is the west coast beach at North White Cliffs which has a sand escarpment scoured by the fast moving tidal currents of the Great Sandy Strait. Network members identified exotic and other non-native flora at three of the beach areas surveyed. Species identified include Bitu Bush and Groundsel.

Kingfisher Bay Resort at North White Cliffs has the island's only sewerage treatment plant and discharges secondary treated effluent into Hervey Bay.

Public access to beach areas surveyed is unrestricted although a permit is required for vehicular access and/or camping. The most common recreational pursuits are four wheel driving, beach fishing, swimming, sunbaking, picnicing, and beachcombing.

Development proposals identified by network members include: an amenities block for South Waddy Beach; a proposal for housing adjacent to the Poyungan Rocks to Eurong section; and a proposal to change the Dilli Village land tenure.

According to network members litter from offshore sources, predominately fishing and recreational boats, is the biggest problem affecting beaches on the island.

- •••• national park island: low impacts, mainly litter associated with recreational use

Bribie Island

Length of Coastline: 110km (approximate estimate)

Number of Surveys: 6

Coverage: Very good

Bribie Island is the most northern of the Moreton Bay islands (which number more than 300) and is connected to the mainland by a bridge over the waters of the Pumicestone Channel. There is a small resident population located in settlements along the southern quarter of the west and east coasts. The rest of the island is predominately free from development and the northern half of the west coast is protected by the Pumicestone National Park. Pumicestone Channel is itself a marine reserve and significant Dugong habitat.

Network members returned six surveys covering four residential beaches on the west coast, Surf Beach which runs the entire length of the east coast, and Red Beach located in the south west corner.

The shores of White Patch Beach, Banksia Beach, Silvan Beach and Welsby Parade Beach face onto the Pumistone Channel and, as such, do not have dunal systems. Red Beach and Surf Beach both retain dunal systems and these are part of the island's flora and fauna reserve. Dunal areas are up to 18 metres high and 35 metres wide in places. Non-native flora identified by network members include Umbrella trees, Asparagas Fern, Cassia Easter, Marram grass, Morning Glory and Bitu Bush.

Network members identified stormwater outlet pipes at three of the beach areas surveyed, one of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include plastic bags, food wrapper and cans.

The island has a sewerage treatment plant that discharges secondary treated effluent to the ocean through an outfall that is located on the south coast.

Network members identified four creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, litter and debris.

Public access to beach areas surveyed is unrestricted and the beaches are popular with all types of recreational users.

The island has a new residential development, the Pacific Harbour Housing Estate, incorporating a canal development adjacent to existing residential areas at Silvan, Banksia, and White Patch Beaches. Network members use additional comments to raise concerns about the impacts of stormwater and sewage from this development on the waters of Pumicestone Passage.

••• 1/2 moderately populated in parts: moderate impacts in parts.

Caloundra to QLD/NSW Border

Length of Coastline: 180km (approximate estimate)

Number of Surveys: 25

Coverage: Very good

Caloundra to Tweed Heads takes in the twin cities of Brisbane and the Gold Coast and is the most heavily populated region in Queensland. The only areas of coastline free from urban development are small stretches between Caloundra and Deception Bay, and between Redland Bay and Coomera.

Network members returned 25 surveys: 19 for individual beaches, three group surveys and three section surveys. Lengths of beach areas surveyed range from 200 metres to six kilometres.

The beaches of Moreton Bay do not retain dunal systems as they are protected from the open ocean by Bribie, Moreton and Stradbroke Islands. The Gold Coast beaches have small dunal systems most of which have been heavily compromised by beach-front property development.

All but one of the beach areas surveyed are located in urban areas and, in places, development often infringes to within 50 metres of the high tide mark. Network members identified stormwater outlet pipes at 16 of the beach areas surveyed, eight of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include cigarette butts, cans, bottles, food wrappers and plastic bags.

Network members identified nine sewerage outfalls discharging in the vicinity of beach areas surveyed. All nine discharge secondary treated effluent or better into estuarine environments.

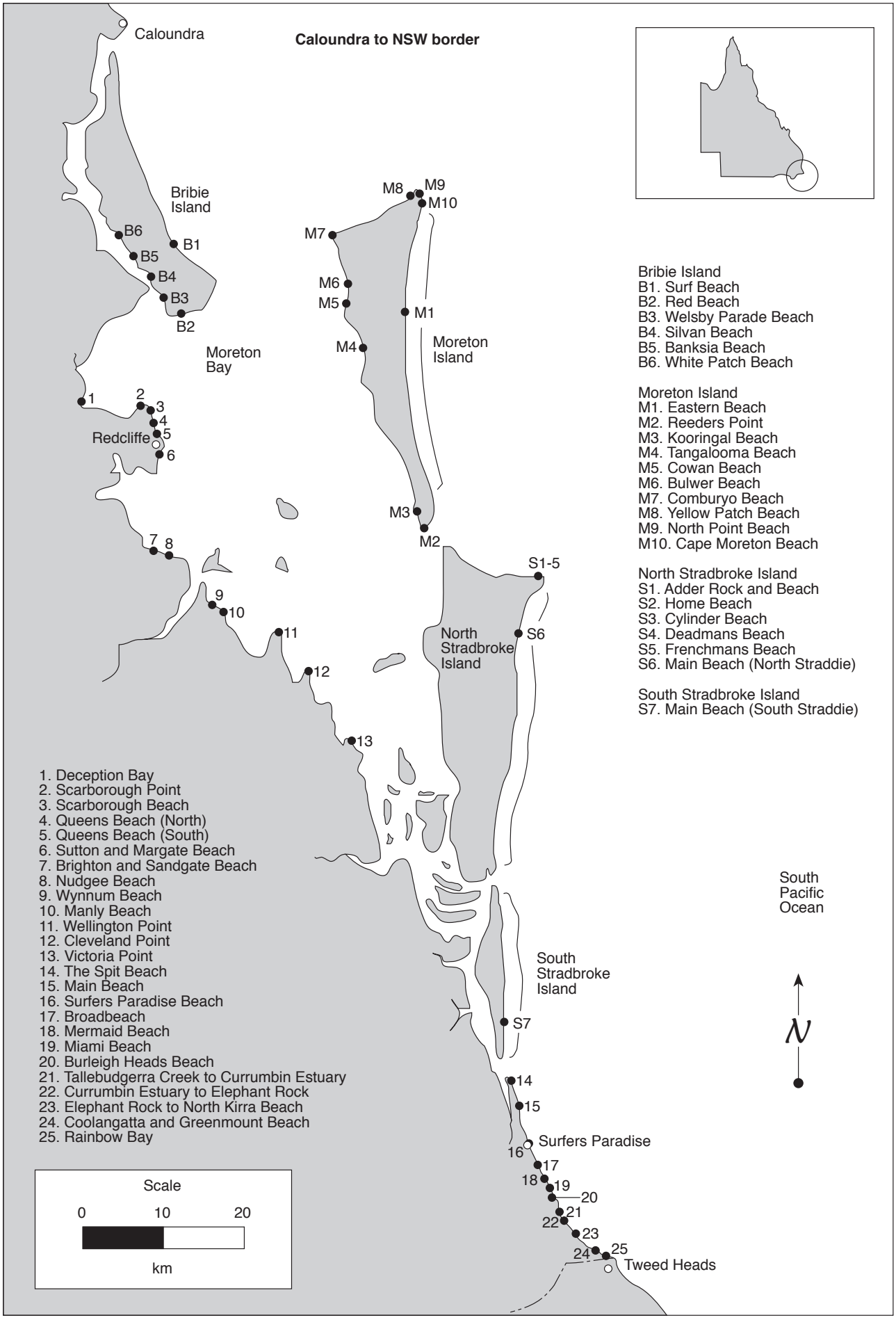
Network members identified three rivers and eight creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, litter/debris and sewage. The most heavily compromised systems in terms of the variety and magnitude of pollution sources are the South Pine River, Brisbane River, Nerang River and Broadwater.

Public access to beach areas surveyed is unrestricted and despite the high density beach-front development, there are well maintained walkways facilitating easy access to most of the Gold Coast beaches whilst at the same time protecting the small dunal buffers from wayward pedestrian traffic.

Network members identified development proposals affecting seven of the beach areas surveyed including four involving housing development and three involving marina/canal development. In addition, the Gold Coast city council in collaboration with the New South Wales government is planning to install a permanent sand by-pass system for the Tweed River entrance. This system will hopefully reduce the increased levels of beach erosion resulting from the extension of the Tweed River training walls in the early 1960s.

Network members use additional comments to highlight a number of issues including: the impacts of urban runoff and sewage on rivers and creeks; ongoing residential and commercial development; litter from both onshore and offshore sources including recreational vessels.

- 1/2 heavily populated: high impacts in parts


Caloundra to NSW border
Caloundra
Bribie Island
B6
B1
B5
B4
B3
B2
Moreton Bay
Redcliffe
1
2
3
4
5
6
7
8
9
10
11
12
13
M8
M9
M10
M7
M6
M5
M1
M4
Moreton Island
M3
M2
S1-5
North Stradbroke Island
S6
South Stradbroke Island
S7
14
15
16
Surfers Paradise
17
18
19
20
21
22
23
24
25
Tweed Heads
South Pacific Ocean
N
Bribie Island
B1. Surf Beach
B2. Red Beach
B3. Welsby Parade Beach
B4. Silvan Beach
B5. Banksia Beach
B6. White Patch Beach
Moreton Island
M1. Eastern Beach
M2. Reeders Point
M3. Kooringal Beach
M4. Tangalooma Beach
M5. Cowan Beach
M6. Bulwer Beach
M7. Comburyo Beach
M8. Yellow Patch Beach
M9. North Point Beach
M10. Cape Moreton Beach
North Stradbroke Island
S1. Adder Rock and Beach
S2. Home Beach
S3. Cylinder Beach
S4. Deadmans Beach
S5. Frenchmans Beach
S6. Main Beach (North Straddie)
South Stradbroke Island
S7. Main Beach (South Straddie)
1. Deception Bay
2. Scarborough Point
3. Scarborough Beach
4. Queens Beach (North)
5. Queens Beach (South)
6. Sutton and Margate Beach
7. Brighton and Sandgate Beach
8. Nudgee Beach
9. Wynnum Beach
10. Manly Beach
11. Wellington Point
12. Cleveland Point
13. Victoria Point
14. The Spit Beach
15. Main Beach
16. Surfers Paradise Beach
17. Broadbeach
18. Mermaid Beach
19. Miami Beach
20. Burleigh Heads Beach
21. Tallebudgerra Creek to Currumbin Estuary
22. Currumbin Estuary to Elephant Rock
23. Elephant Rock to North Kirra Beach
24. Coolangatta and Greenmount Beach
25. Rainbow Bay
Scale
0
10
20
km

Moreton Island

Length of Coastline: 220km (approximate estimate)

Number of Surveys: 10

Coverage: Good

Moreton Island is the second largest sand island in the world (Fraser Island is the largest) and has the world's highest permanent sand dune, Mount Tempest, at approximately 280 metres above sea level. There is a small resident population located at Kooringal and Bulwer Beaches and a small resort, the Tangalooma Island Resort, on the mid west coast. The rest of the island is free from development and protected by national park.

Network members returned 10 surveys providing good coverage of the island. All of the surveys are for individual beaches: lengths range from five kilometres to 38 kilometres.

All but one of the beach areas surveyed retain a dunal system, the exception being Cape Moreton Beach which is located at the bottom of a cliff. The dunes along Eastern Beach average 15 metres high and 100 metres wide. The west coast beaches have much smaller dunes, up to four metres high and 40 metres wide in places. There were non-native flora, mainly Lantana, identified at six of the beach areas surveyed.

According to network members, only one of the beach areas surveyed is located in an urban area although six have property and/or infrastructure development within 250 metres of the high tide mark. Network members did not identify any stormwater outlets at beach areas surveyed. There are no sewerage outfalls on the island and residential areas are serviced by septics.

Public access to beach areas surveyed is unrestricted and the beaches popular with all types of recreational users.

Network members identified two development proposals: expansion of the Tangalooma Island Resort and some new housing at Bulwer.

Network members use additional comments to highlight a number of issues including: the impacts of pedestrian traffic and four wheel drives on dunal areas; litter from recreational users, particularly campers, and washed ashore from recreational and fishing vessels.

•••• national park island: low impacts

North Stradbroke Island

Length of Coastline: 150 km (approximate estimate)

Number of Surveys: 7

Coverage: Good

North Stradbroke Island is located just a couple of kilometres offshore from Victoria Point and has a small resident population together with resort accommodation and camping grounds located at Dunwich, Amity Point and Point Lookout. To the east of Dunwich, Blue Lake National Park protects approximately 445 hectares of coastal bushland.

Network members returned six surveys: five for beaches adjacent to Point Lookout, and one for Main Beach which runs the entire length of the east coast and is approximately 32 kilometres long. Lengths of the other beach areas surveyed range from one to eight kilometres.

All of the beaches retain dunal systems, some of which are up to 100 metres high in places. Non-native flora identified by network members include Lantana, Bitu Bush, Cactus, Grounsill, Asparagus Fern, Pine trees and Pepper trees.

According to network members, none of the beach areas surveyed are located in urban areas, although all six have property and/or infrastructure development within 250 metres of the high tide mark. In some places development infringes to within 50 metres of the high tide mark. Network members identified stormwater outlet pipes at the northern end of Main Beach. Sewage from Point Lookout is treated and disposed of on land.

Public access to beach areas surveyed is unrestricted and the beaches are popular with all types of recreational users.

According to network members there is revegetation work proposed as part of the new town plan for dunal areas at Home Beach. Other initiatives include the rezoning for protection of a one kilometre buffer at the northern end of Main Beach, an area currently zoned for development.

Network members use additional comments to highlight a number of issues including threats to the natural and cultural heritage of the island from inappropriate property development.

••• 1/2 sparsely populated: moderate impacts in places

South Stradbroke Island

Length of Coastline: 50 km (approximate estimate)

Number of Surveys: 1

Coverage: Good

South Stradbroke Island is located at the entrance to the Gold Coast seaway and can be accessed via ferry or by paddling across the seaway. The island has a small resident population and is frequented by surfers who use the world class surfing banks in the south east corner.

Network members returned one survey for the east coast beach which runs the entire length of the island and is approximately 20 kilometres long. This beach is free from any direct pollution sources except for litter, although it may from time to time be affected, depending on currents, by sewage effluent and other pollution sources that enter the Gold Coast seaway.

According to network members, the biggest problem is litter left behind by surfers who camp in the south-west corner.

••• 1/2 small resort island: moderate impacts associated with recreational use

3.3 New South Wales

New South Wales has a coastline, including major islands, of approximately 1900 kilometres[14]. Along the mainland coast there are around 772 beaches[4]. The survey targeted all areas of the mainland coast and Norfolk and Lord Howe Islands.

Network members returned 373 surveys providing data on 360 mainland beach areas and 13 island beach areas. Of the surveys, 339 are for individual beaches, 13 are for groups of two or more beaches, and 21 are for sections of coastline between two geographic points.

According to network members, 85 (23 per cent) of the beach areas surveyed are without dunes including 29 that have lost their dunal system to urban development. Network members identified exotic and other non-native flora at 205 (55 per cent) of the beach areas surveyed. Species identified are mainly common knowledge species like Bitu Bush and Lantana. Other species identified include Prickly Pear, Fireweed, Marram grass, Blackberries, Geraniums, Caprosma and various non-native grasses.

According to network members, 187 (50 per cent) of the beach areas surveyed are located in urban areas and 280 (75 per cent) have some form of property and/or infrastructure development within 250 metres of the high tide mark.

Network members identified stormwater outlet pipes at 129 (35 per cent) of the beach areas surveyed, 64 (50 per cent) of which had litter evident in the vicinity of pipe discharge at the time of survey. The four most common litter categories evident were cigarette butts (97 per cent), plastic bags (80 per cent), food wrappers (73 per cent), and PET/plastic bottles (69 per cent).

Network members identified 43 public sewerage outfalls discharging in the vicinity of beach areas surveyed: 34 discharge to the ocean and nine discharge to estuaries. Treatment standards vary: 36 discharge secondary treated effluent or better, four discharge primary treated effluent, and three discharge screened effluent. Effluent re-use occurs from seven of the systems and the outfalls have a combined discharge of approximately 1.7 billion litres of effluent per day (70 per cent is from outfalls in the Newcastle, Sydney and Wollongong regions).

Network members listed 22 rivers and 68 creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff (83 per cent), agricultural runoff (46 per cent) and litter/debris (41 per cent).

Litter was evident at approximately 80 per cent of the beach areas surveyed. The four most common litter categories evident were food wrappers (77 per cent), plastic bags (70 per cent), plastic bags (67.5 per cent) and plastic/PET bottles (62.5 per cent).

Network members identified mining operations at 14 (four per cent) of the beach areas surveyed inlcuding nine sandmines, two shellgrit, two coal and one gravel quarry.

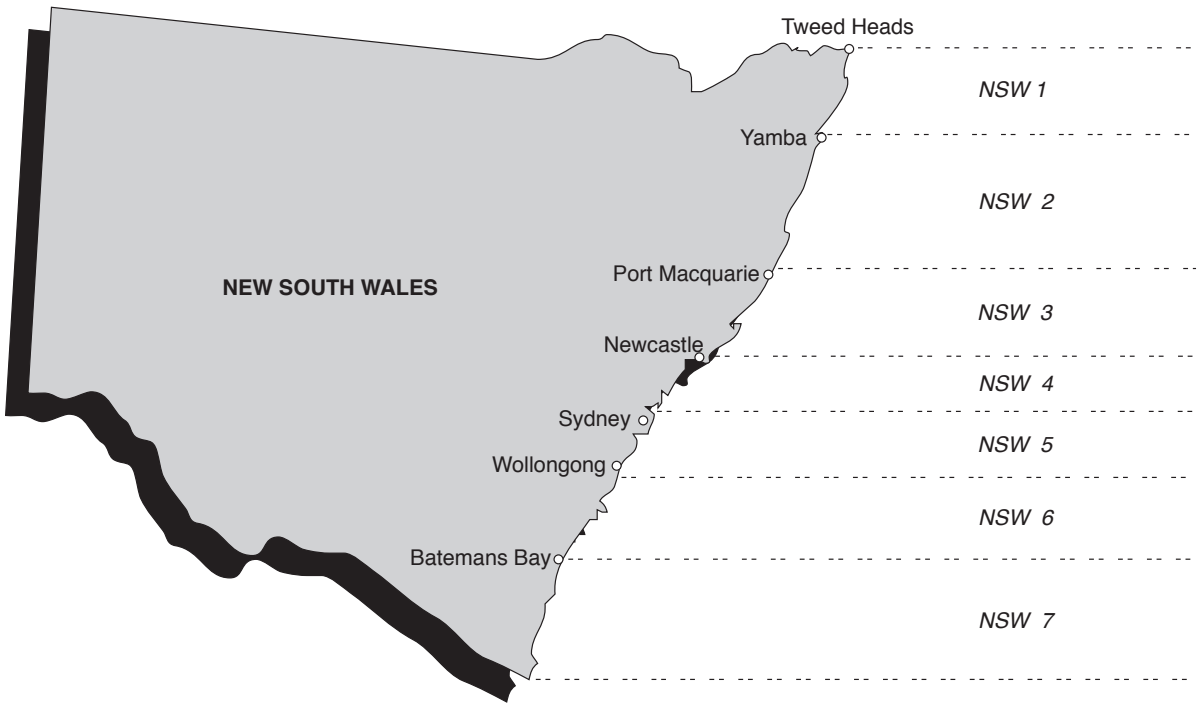
Network members identified development proposals affecting 102 (27 per cent) of the beach areas surveyed, including 58 involving housing development, 17 involving resort development, 11 involving golf course development and six involving marina/canal development.

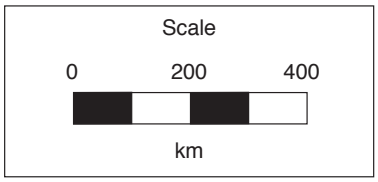
Public access to beach areas surveyed is, in the main, unrestricted, although there are 20 beach areas where according to network members, private property hinders public access. A further three beach areas are closed to the public: two for defence purposes and one because of private property.

Network members use additional comments to highlight a number of issues and these are covered in the regional summaries.

New South Wales coastal regions

NSW 1. Qld border to Clarence River
NSW 2. Clarence River to Hastings River
NSW 3. Hastings River to Port Stephens
NSW 4. Port Stephens to Broken Bay
NSW 5. Broken Bay to Bass Point
NSW 6. Bass Point to Batemans Bay
NSW 7. Batemans Bay to Vic border





QLD Border to Clarence River

Length of Coastline: 170km (approximate estimate)

Number of Surveys: 28

Coverage: Very good

The Queensland border to the Clarence River takes in the major coastal towns of Byron Bay and Ballina and many smaller towns including Kingscliff, Brunswick Heads, Lennox Head, Evans Head and Iluka. Approximately one third of the coastline is held in conservation tenure, the most notable of which are the Bradwater and Bundjalung National Parks. Other conservation reserves include the Brunswick, Tyagarah, Cape Byron and Broken Head Nature Reserves. Byron Bay is the Australian mainland's most easterly location and marks the point at which prevailing winds and currents change from temperate to subtropical. This region is extremely popular with tourists and has, in recent years, been one of the top ten regions for population growth and building development in Australia.

In total, there were 28 surveys returned providing good coverage of the region: 14 are for individual beaches, two are group surveys, and 12 are section surveys. Lengths of beach areas surveyed range from 400 metres to 16 kilometers.

All but two of the beach areas surveyed retain dunal systems. The exceptions are Wategoes Beach at Byron Bay, which has had its dune replaced by urban development, and Boulder Beach, near Lennox Head. Dune sizes range in heights from one to 20 metres and widths from four to 200 metres, the average being around six metres high and 50 metres wide. Network members note a high incidence of exotic and other non-native flora species including Bitu Bush and Lantana.

According to network members, 17 of the beach areas surveyed are located in urban areas and a further nine have property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at 12 of the beach areas surveyed, six of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include cigarette butts, plastic bags, food wrappers, bottles and cans.

Network members identified six public sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Tweed Heads, Ocean Shores, Brunswick Heads, Byron Bay and Skennars Head. All but one discharge to estuarine environments and all six discharge secondary treated effluent or better. Effluent re-use occurs from two of these systems.

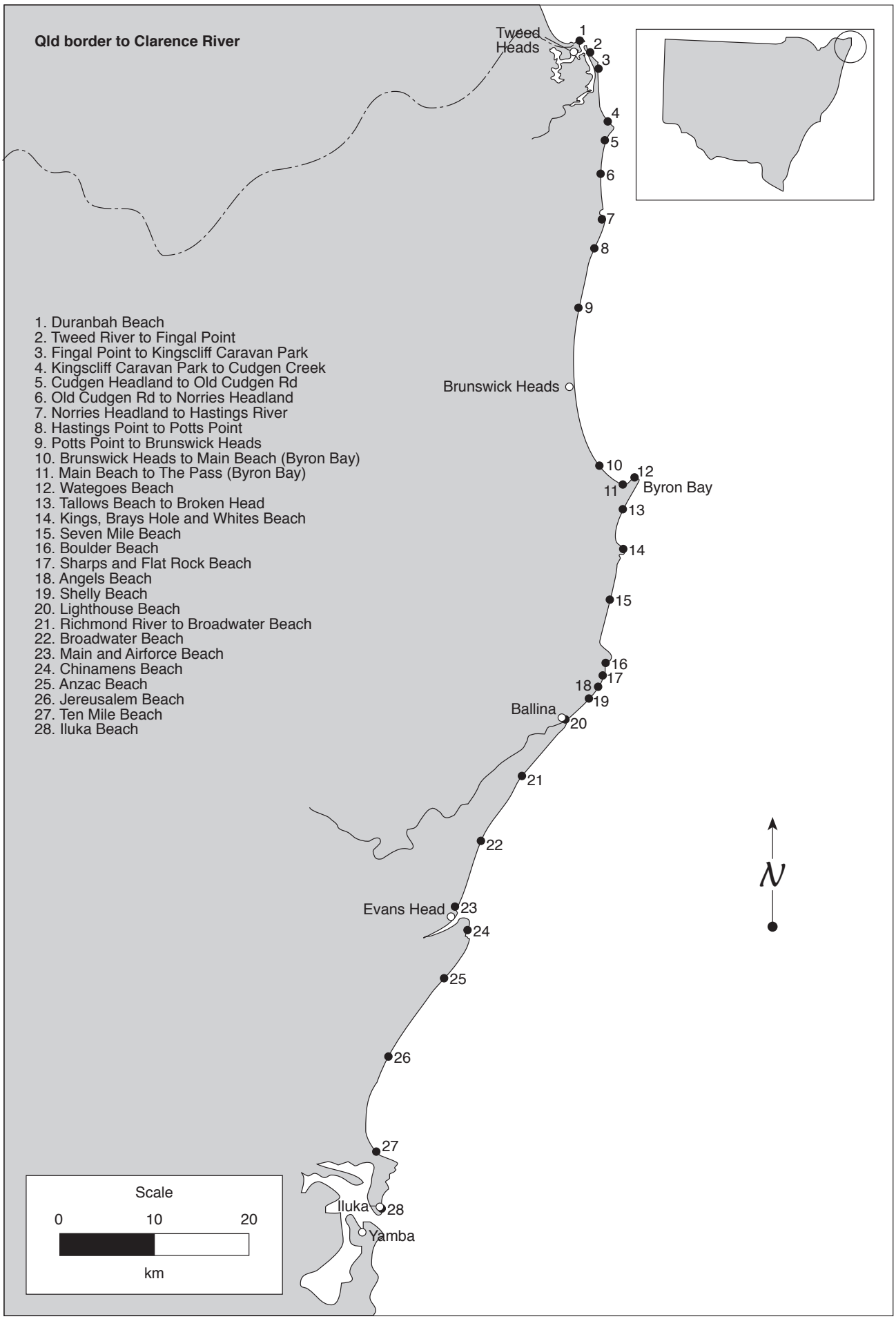
Network members identified six rivers and five creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff, sewage and industrial effluent.

Public access to beach areas surveyed is, in the main, unrestricted with the exception of Anzac Beach which is closed for the purpose of an Airforce gunnery range.

Network members identified development proposals affecting 14 of the beach areas surveyed including eight involving housing development.

Network members use additional comments to highlight a number of issues including: litter; the proliferation of Bitu Bush; the need for better management of population growth and property development.

••• moderately populated: moderate impacts


Qld border to Clarence River
Tweed Heads
Brunswick Heads
Byron Bay
Ballina
Evans Head
Iluka
Yamba
1. Duranbah Beach
2. Tweed River to Fingal Point
3. Fingal Point to Kingscliff Caravan Park
4. Kingscliff Caravan Park to Cudgen Creek
5. Cudgen Headland to Old Cudgen Rd
6. Old Cudgen Rd to Norries Headland
7. Norries Headland to Hastings River
8. Hastings Point to Potts Point
9. Potts Point to Brunswick Heads
10. Brunswick Heads to Main Beach (Byron Bay)
11. Main Beach to The Pass (Byron Bay)
12. Wategoes Beach
13. Tallows Beach to Broken Head
14. Kings, Brays Hole and Whites Beach
15. Seven Mile Beach
16. Boulder Beach
17. Sharps and Flat Rock Beach
18. Angels Beach
19. Shelly Beach
20. Lighthouse Beach
21. Richmond River to Broadwater Beach
22. Broadwater Beach
23. Main and Airforce Beach
24. Chinamens Beach
25. Anzac Beach
26. Jereusalem Beach
27. Ten Mile Beach
28. Iluka Beach
Scale
0
10
20
km
N

Clarence River to Hastings River

Length of Coastline: 280km (approximate estimate)

Number of Surveys: 64

Coverage: Good

Clarence River to Hastings River takes in the city of Coffs Harbour and many smaller towns including Yamba, Woolgoolga, Sawtell, Urunga, Nambucca Heads, South West Rocks and Crescent Head. Approximately 12 per cent of the coastline is held in conservation tenure, the most notable of which are the Angourie, Yuraygir, Red Rock, Hat Head and Limeburners National Parks.

Network members returned 64 surveys providing good coverage of the region: 60 are for individual beaches and four are section surveys. Lengths of beach areas surveyed range range from 100 metres to 12 kilometres.

All but three of the beach areas surveyed have dunes. The exceptions include Yamba Beach whose dune was replaced by a rock and concrete wall in the mid 1970s. Dunes range in size from heights of two to 12 metres, and widths from six to 200 metres. Network members identified exotic and other non-native flora at 53 of the beach areas surveyed including Bitu Bush and Lantana.

According to network members, 24 of the beach areas surveyed are located in urban areas and a further 17 have property and/or infrastructure development within 250 metres of the high tide mark.

Network members identified stormwater outlet pipes at 13 of the beach areas surveyed, four of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include plastic bags, food wrappers, bottles, cans, and cigarette butts.

Network members identified five public sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Woolgoolga, Coffs Harbour, Sawtell, Port Macquarie and Crescent Head. The Woolgoolga and Port Macquarie outfalls discharge to estuaries, the others to the ocean and all but the Crescent Head outfall discharge secondary treated effluent or better.

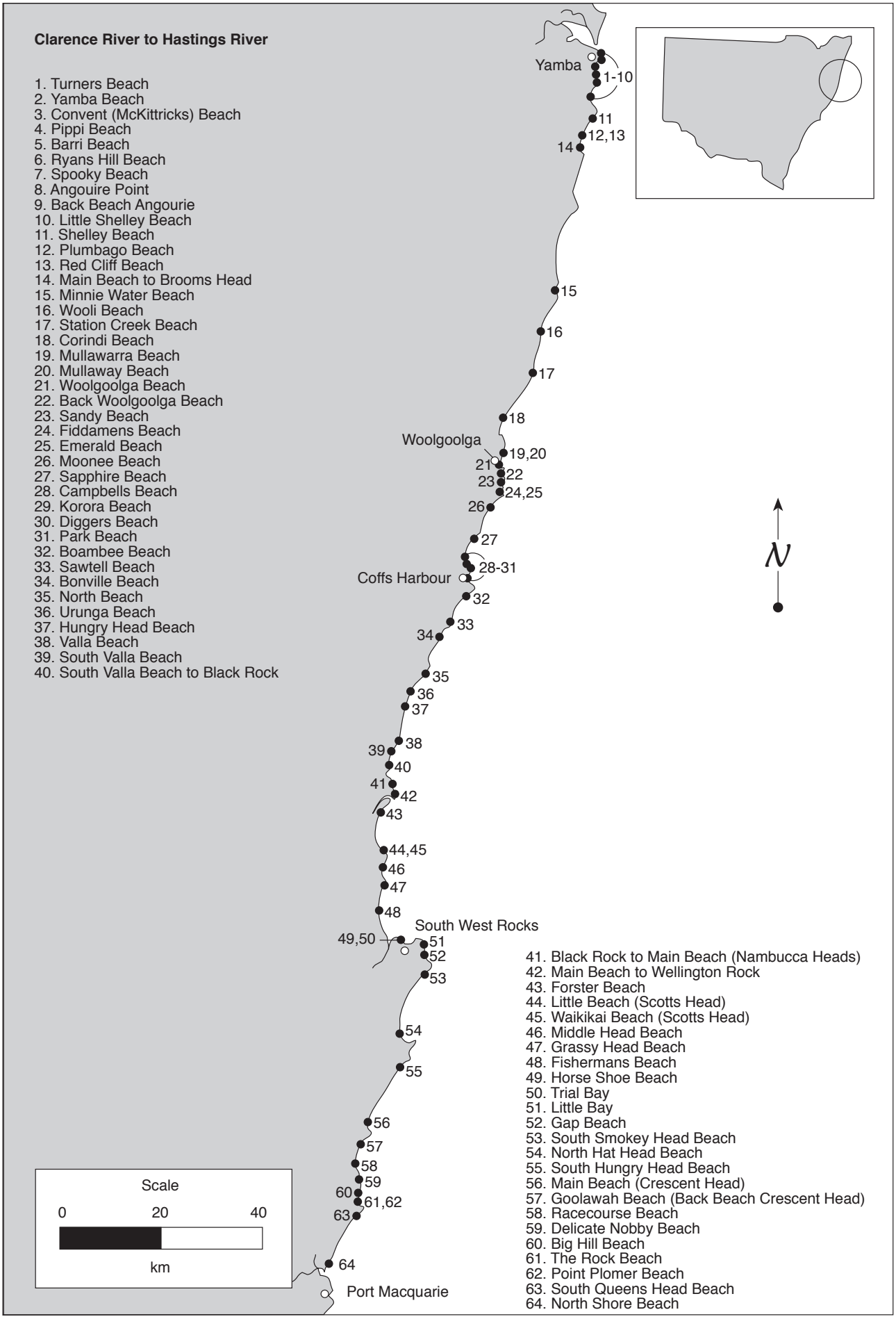
Network members identified three rivers and 14 creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff, litter and debris, sewage and industrial effluent. The Clarence and Hastings Rivers are noted as being heavily compromised by a variety of pollution sources.

Public access to beach areas surveyed is, in the main, unrestricted although network members note that access to Convent (McKittricks) is hindered by beach front property.

Network members identified development proposals affecting 17 of the beach areas surveyed including eight involving housing development and one involving resort development.

Network members use additional comments to highlight a number of issues including: increasing urbanisation of the coast; proliferation of Bitu Bush and Lantana; litter.

••• moderately populated: moderate impacts


Clarence River to Hastings River
1. Turners Beach
2. Yamba Beach
3. Convent (McKittricks) Beach
4. Pippi Beach
5. Barri Beach
6. Ryans Hill Beach
7. Spooky Beach
8. Angouire Point
9. Back Beach Angourie
10. Little Shelley Beach
11. Shelley Beach
12. Plumbago Beach
13. Red Cliff Beach
14. Main Beach to Brooms Head
15. Minnie Water Beach
16. Wooli Beach
17. Station Creek Beach
18. Corindi Beach
19. Mullawarra Beach
20. Mullaway Beach
21. Woolgoolga Beach
22. Back Woolgoolga Beach
23. Sandy Beach
24. Fiddamens Beach
25. Emerald Beach
26. Moonee Beach
27. Sapphire Beach
28. Campbells Beach
29. Korora Beach
30. Diggers Beach
31. Park Beach
32. Boambee Beach
33. Sawtell Beach
34. Bonville Beach
35. North Beach
36. Urunga Beach
37. Hungry Head Beach
38. Valla Beach
39. South Valla Beach
40. South Valla Beach to Black Rock
Yamba
1-10
11
12,13
14
15
16
17
18
Woolgoolga
19,20
21
22
23
24,25
26
27
28-31
Coffs Harbour
32
33
34
35
36
37
39
38
40
41
42
43
44,45
46
47
48
South West Rocks
49,50
51
52
53
54
55
56
57
58
59
60
61,62
63
64
Port Macquarie
N
Scale
0
20
40
km
41. Black Rock to Main Beach (Nambucca Heads)
42. Main Beach to Wellington Rock
43. Forster Beach
44. Little Beach (Scotts Head)
45. Waikikai Beach (Scotts Head)
46. Middle Head Beach
47. Grassy Head Beach
48. Fishermans Beach
49. Horse Shoe Beach
50. Trial Bay
51. Little Bay
52. Gap Beach
53. South Smokey Head Beach
54. North Hat Head Beach
55. South Hungry Head Beach
56. Main Beach (Crescent Head)
57. Goolawah Beach (Back Beach Crescent Head)
58. Racecourse Beach
59. Delicate Nobby Beach
60. Big Hill Beach
61. The Rock Beach
62. Point Plomer Beach
63. South Queens Head Beach
64. North Shore Beach

Hastings River to Port Stephens

Length of Coastline: 205km (approximate estimate)

Number of Surveys: 36

Coverage: Good

Hastings River to Port Stephens takes in the major coastal towns of Port Macquarie and Forster/Tuncurry, and many smaller towns including Lake Cathie, North Haven, Old Bar, Hallidays Point, Seal Rocks and Hawks Nest. Approximately one-fifth of the coastline is held in conservation tenure, the most notable of which are the Crowdy Bay and Myall Lakes National Parks. Due to it's close proximity to Newcastle and Sydney the region is extremely popular with holidaymakers and surfers from both cities.

Network members returned 36 surveys providing good coverage of the region: 33 are for individual beaches, one is a group survey taking in Old Bar and Wallabi Beach, and two are section surveys covering Wallabi Point to Saltwater and Lake Cathie to Rainbow Beach. Lengths of beach areas surveyed range from 100 metres to 18 kilometres.

All but three of the beach areas surveyed have dunes ranging in size from heights of two to 30 metres and widths from 15 to 200 metres. Network members identified exotic and other non-native flora at 28 of the beach areas surveyed, predominately Bitu Bush and Lantana.

According to network members, 25 of the beach areas surveyed are located in urban areas and, in places, development often infringes to within 50 metres of the high tide mark. Network members identified stormwater outlet pipes at 17 of the beach areas surveyed, 14 of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include cigarette butts, plastic bags and food wrappers.

Network members identified four public sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Port Macquarie, Harrington, Camden and Jaineys Corner. Port Macquarie is the largest discharging approximately 10 million litres per day of tertiary treated effluent into Kooloonbung Creek (tributary of the Hastings River). The flora at Harrington near Taree discharges tertiary treated effluent to a wetland that feeds into the Manning River. The other two plants, Camden Head and Jaineys Corner, discharge secondary treated effluent directly into the ocean.

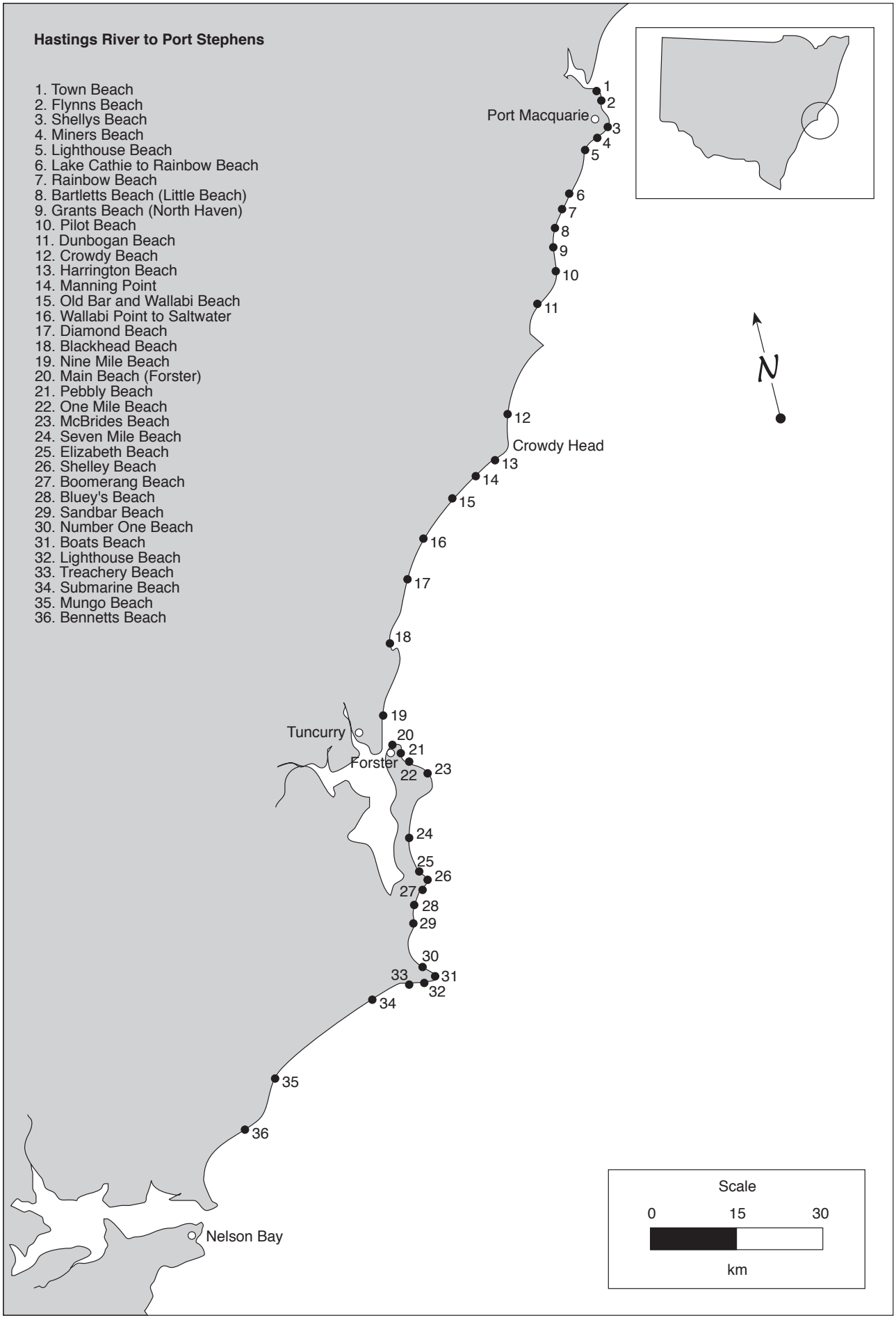
Network members identified three rivers and three creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff and litter.

Public access to the beach areas surveyed is, in the main, unrestricted, although there are two beach areas (Sandbar Beach and Treachery Beach) where, according to network members, access is hindered by private property.

Network members identified development proposals affecting 11 of the beach areas surveyed including the Camden Shores Residential Canal Development at North Haven which is strongly opposed by many in the local community.

Network members use additional comments to highlight a number of issues including: stormwater runoff from urban areas; dune erosion resulting from pedestrian traffic and four wheel drives; proliferation of Bitu Bush and Lantana; litter.

••• moderately populated: moderate impacts


Hastings River to Port Stephens
1. Town Beach
2. Flynns Beach
3. Shellys Beach
4. Miners Beach
5. Lighthouse Beach
6. Lake Cathie to Rainbow Beach
7. Rainbow Beach
8. Bartletts Beach (Little Beach)
9. Grants Beach (North Haven)
10. Pilot Beach
11. Dunbogan Beach
12. Crowdy Beach
13. Harrington Beach
14. Manning Point
15. Old Bar and Wallabi Beach
16. Wallabi Point to Saltwater
17. Diamond Beach
18. Blackhead Beach
19. Nine Mile Beach
20. Main Beach (Forster)
21. Pebbly Beach
22. One Mile Beach
23. McBrides Beach
24. Seven Mile Beach
25. Elizabeth Beach
26. Shelley Beach
27. Boomerang Beach
28. Bluey's Beach
29. Sandbar Beach
30. Number One Beach
31. Boats Beach
32. Lighthouse Beach
33. Treachery Beach
34. Submarine Beach
35. Mungo Beach
36. Bennetts Beach
Port Macquarie
Crowdy Head
Tuncurry
Forster
Nelson Bay
N
Scale
0
15
30
km

Port Stephens to Broken Bay

Length of Coastline: 185km (approximate estimate)

Number of Surveys: 43

Coverage: Excellent

Port Stephens to Broken Bay takes in the city of Newcastle and numerous other coastal settlements including Nelson Bay, Catherine Hill Bay, Budgewoi, The Entrance, Terrigal, and Woy Woy. Conservation reserves comprise approximately five per cent of the coastline and include Tomaree, Wyrrabalong and Bouddi national parks. Newcastle has Australia's second busiest port with two coal terminals, a steel works and many other industries situated on the harbour. On most days there are as many as 20 ships anchored just offshore waiting for berths. Despite its industrial facade, the city boasts fine surfing beaches and a quality of life that is highly regarded by many who live there. Just to the south of Newcastle, the sprawling urban centres of Wyong and Gosford encompass, with adjacent coastal settlements, a 'city' of sorts and are collectively called the Central Coast.

Network members returned 43 surveys providing excellent coverage of the region: 39 are for individual beaches, three are section surveys and one is a group survey. Lengths of beach areas surveyed range from 100 metres to six kilometres.

Of the beach areas surveyed, there are 11 without dunes including two that have lost their dunal system to urban development. Dune sizes recorded by network members range in heights from two to 100 metres, and widths from four metres to 1.5 kilometres. Network members identified non-native flora at 25 of the beach areas surveyed, predominately Bitu Bush, Lantana and Marram grass.

According to network members, 33 of the beach areas surveyed are located in urban areas. Of the rest, all but two have property and/or infrastructure development within 250 metres of the high tide mark. In total, there are 11 beach areas where development infringes to within 50 metres of the high tide mark. Network members identified stormwater outlet pipes at 21 of the beach areas surveyed, two of which had litter evident at the time of survey.

Network members identified nine public sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Boulder Bay, Stockton, Burwood Beach, Belmont, Little Beach, Norah Head, Wonga Point, Winney Bay and Point Frederick. All nine outfalls discharge to the ocean and all but one discharge secondary treated effluent or better.

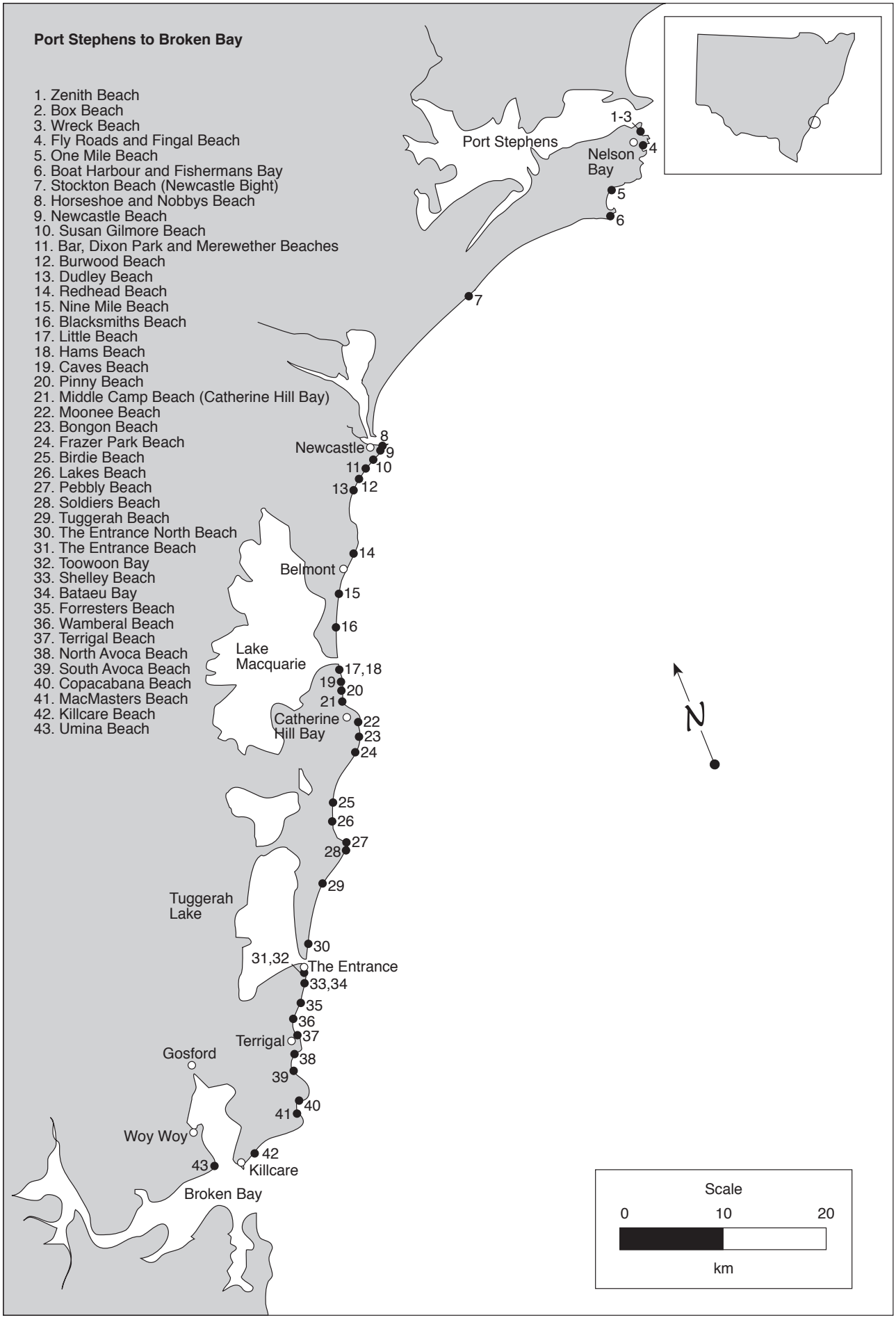
Network members identified 17 water courses as sources of beach pollution via their respective catchments including the Hunter River Estuary (Newcastle Harbour), the Swansea Channel (Lake Macquarie), and the Hawkesbury River Estuary (Broken Bay). Pollution sources include urban runoff, agricultural runoff, sewage and industrial effluent.

Public access to the beach areas surveyed is, in the main, unrestricted, although network members note four beach areas where private property hinders access. In addition, parts of the Little Beach area on the central coast is closed for the purposes of a Coast Guard Station.

Network members identified development proposals affecting 19 of the beach areas surveyed, including 13 involving housing development. Some of these development are in areas of high conservation value including Newcastle Bight, Belmont Sands and Pinny Beach.

Network members use additional comments to focus on a number of issues including ongoing urbanisation of the coast and the impacts of sandmining on areas of Newcastle Bight which is currently being assessed for listing with the Australian Heritage Commission.

- heavily populated in parts: moderate to high impacts


Port Stephens to Broken Bay
1. Zenith Beach
2. Box Beach
3. Wreck Beach
4. Fly Roads and Fingal Beach
5. One Mile Beach
6. Boat Harbour and Fishermans Bay
7. Stockton Beach (Newcastle Bight)
8. Horseshoe and Nobbys Beach
9. Newcastle Beach
10. Susan Gilmore Beach
11. Bar, Dixon Park and Merewether Beaches
12. Burwood Beach
13. Dudley Beach
14. Redhead Beach
15. Nine Mile Beach
16. Blacksmiths Beach
17. Little Beach
18. Hams Beach
19. Caves Beach
20. Pinny Beach
21. Middle Camp Beach (Catherine Hill Bay)
22. Moonee Beach
23. Bongon Beach
24. Frazer Park Beach
25. Birdie Beach
26. Lakes Beach
27. Pebbly Beach
28. Soldiers Beach
29. Tuggerah Beach
30. The Entrance North Beach
31. The Entrance Beach
32. Toowoon Bay
33. Shelley Beach
34. Bataeu Bay
35. Forresters Beach
36. Wamberal Beach
37. Terrigal Beach
38. North Avoca Beach
39. South Avoca Beach
40. Copacabana Beach
41. MacMasters Beach
42. Killcare Beach
43. Umina Beach
Port Stephens
Nelson Bay
Newcastle
Belmont
Lake Macquarie
Catherine Hill Bay
Tuggerah Lake
The Entrance
Terrigal
Gosford
Woy Woy
Killcare
Broken Bay
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Scale
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km

Broken Bay to Bass Point

Length of Coastline: 190km (approximate estimate)

Number of Surveys: 73

Coverage: Excellent

Broken Bay to Bass Point takes in the cities of Sydney and Wollongong, the industrial centre of Port Kembla, and numerous other coastal settlements including Stanwell Park, Coalcliff, Clifton, Scarborough, Wombarra, Coledale, Austinmer, Thirroul, and Bulli, Windwang and Shellharbour. It is the most heavily populated region in Australia. Coastal areas free from urban development are rare but include the Royal National Park, Australia's first national park declared in 1879, which protects approximately 15 000 hectares of coastal forest, bushland and heath.

Network members returned 73 surveys providing excellent coverage of the region. All but two of the surveys are for individual beach areas, the exceptions being a group survey taking in Long Reef and Dee Why Beach and a section survey from Wanda Beach to Eloura. Lengths of beach areas surveyed range from 100 metres to seven kilometres.

According to network members, 35 of the beaches are without dunes including 20 that have lost their dunal system to urban development. Where dunes exist they range in size from heights of two to 30 metres and widths from three to 500 metres. Network members identified exotic and other non-native flora at 13 of the beach areas surveyed including Bitu Bush and Lantana.

All but seven of the beach areas surveyed are located in urban areas and development often infringes to within 50 metres of the high tide mark. Of the seven non-urban beaches, five are located in the Royal National Park. Network members identified stormwater outlet pipes at 32 of the beach areas surveyed, 21 of which had litter evident in the vicinity of pipe discharge at the time of survey. Many of these outlets service large catchments and some are big enough to drive a truck into. At smaller shelted beaches, for example Tamarama and Bronte, it can take a number of days following a storm before near shore waters are clear of sediment and debris. Litter categories evident in the vicinity of stormwater pipe discharge at the time of survey include cigarette butts, plastic bags, food wrappers and to a lesser extent, condoms and syringes.

Network members identified nine public sewage outfalls discharging in the vicinity of the beach areas surveyed. All nine discharge to the ocean. The three biggest (North Head, Bondi and Malabar) discharge through extended outfalls: North Head discharges secondary treatment effluent, Bondi and Malabar discharge high rate primary. The other six outfalls are located at Warriewood, Potter Point, Bellambi Point, Wollongong (Corniston), Port Kembla (Red Point) and Shellharbour (Barrack Point) and all but Port Kembla discharge secondary treated effluent or better. The nine outfalls identified have a combined discharge of approximately one billion litres per day, although discharge peaks during wet periods can be more than double this amount.

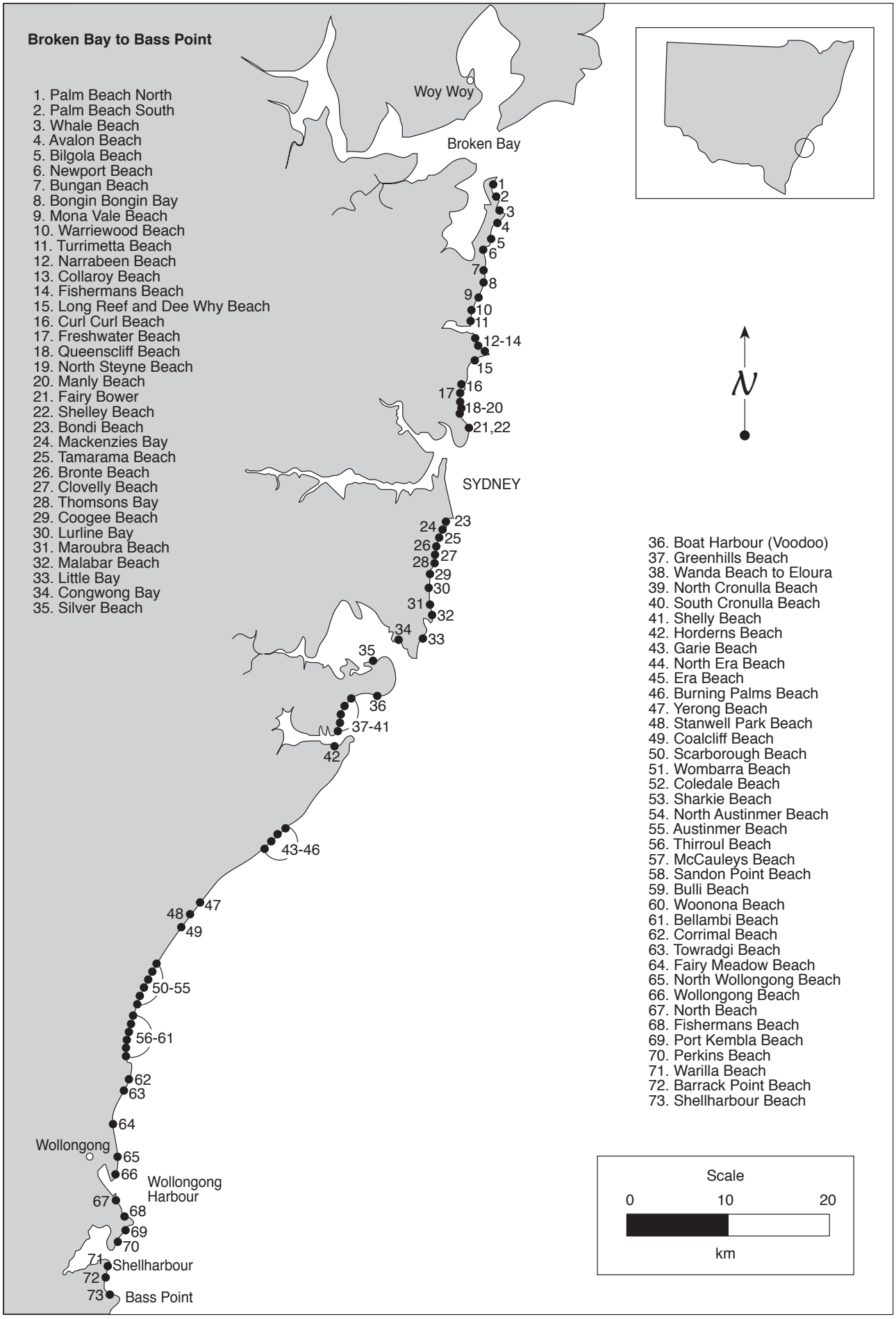
Network members identified 21 water courses as sources of beach pollution via their respective catchments. The majority are compromised by urban runoff and in some cases sewage effluent, industrial discharge and agricultural runoff.

Public access to the beach areas surveyed is, in the main, unrestricted although network members note three instances where beach front property hinders access.

Network members identified development proposals affecting 20 of the beach areas surveyed including 16 involving housing development. Some of these involve re-development of existing residential areas and incorporate medium or high density developments. Other development proposals noted include the Shellharbour marina proposal which is strongly opposed by many in the local community.

Network members use additional comments to focus mainly on water quality problems pertaining to stormwater and sewage.

- heavily populated: high impacts


Broken Bay to Bass Point
1. Palm Beach North
2. Palm Beach South
3. Whale Beach
4. Avalon Beach
5. Bilgola Beach
6. Newport Beach
7. Bungan Beach
8. Bongin Bongin Bay
9. Mona Vale Beach
10. Warriewood Beach
11. Turrimetta Beach
12. Narrabeen Beach
13. Collaroy Beach
14. Fishermans Beach
15. Long Reef and Dee Why Beach
16. Curl Curl Beach
17. Freshwater Beach
18. Queenscliff Beach
19. North Steyne Beach
20. Manly Beach
21. Fairy Bower
22. Shelley Beach
23. Bondi Beach
24. Mackenzies Bay
25. Tamarama Beach
26. Bronte Beach
27. Clovelly Beach
28. Thomsons Bay
29. Coogee Beach
30. Lurline Bay
31. Maroubra Beach
32. Malabar Beach
33. Little Bay
34. Congwong Bay
35. Silver Beach
36. Boat Harbour (Voodoo)
37. Greenhills Beach
38. Wanda Beach to Eloura
39. North Cronulla Beach
40. South Cronulla Beach
41. Shelly Beach
42. Horderns Beach
43. Garie Beach
44. North Era Beach
45. Era Beach
46. Burning Palms Beach
47. Yerong Beach
48. Stanwell Park Beach
49. Coalcliff Beach
50. Scarborough Beach
51. Wombarra Beach
52. Coledale Beach
53. Sharkie Beach
54. North Austinmer Beach
55. Austinmer Beach
56. Thirroul Beach
57. McCauleys Beach
58. Sandon Point Beach
59. Bulli Beach
60. Woonona Beach
61. Bellambi Beach
62. Corrimal Beach
63. Towradgi Beach
64. Fairy Meadow Beach
65. North Wollongong Beach
66. Wollongong Beach
67. North Beach
68. Fishermans Beach
69. Port Kembla Beach
70. Perkins Beach
71. Warilla Beach
72. Barrack Point Beach
73. Shellharbour Beach
Woy Woy
Broken Bay
SYDNEY
Wollongong
Wollongong Harbour
Shellharbour
Bass Point
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2
3
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Scale
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km

Bass Point to Batemans Bay

Length of Coastline: 200km (approximate estimate)

Number of Surveys: 57

Coverage: Good

Bass Point to Batemans Bay takes in the major coastal towns of Kiama, Ulladulla and Batemans Bay together with numerous other coastal settlements including Gerringong, Gerroa, Shoalhaven Heads, Sussex Inlet, Bendalong, Mollymook, Bawley Point and Durras. Conservation reserves include the Seven Mile Beach, Jervis Bay and Murramarang National Parks; and Comerong Island, Cudmirra and the Narawallee Creek nature reserves.

Network members returned 60 surveys: all but one are for individual beaches, the exception being a section survey covering Orioan Beach to Chinamens Beach. Lengths of beach areas surveyed range from 400 metres to 12 kilometres.

According to network members, 15 of the beach areas surveyed are without dunes including one that has lost its dunal system to urban development. Dune sizes range in height from two to 15 metres, and widths from four to 200 metres. Network members identified exotic and other non-native flora at 35 of the beach areas surveyed including Bitu Bush and Lantana.

According to network members, 13 of the beach areas surveyed are located in urban areas and a further nine have some form of property and/or infrastructure development within 250 metres of the high tide mark.

Nework members identified stormwater outlet pipes at 19 of the beach areas surveyed, six of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include cans, plastic bags and food wrappers.

Network members identified five public sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Barrack Point (Shellharbour), Cathedral Rocks (Kiama), Floraation Point (Jervis Bay), Racecourse Beach (Ulladulla) and Surf Beach (Batemans Bay). All five discharge to the ocean and all but the Kiama outfall discharge secondary treated effluent or better.

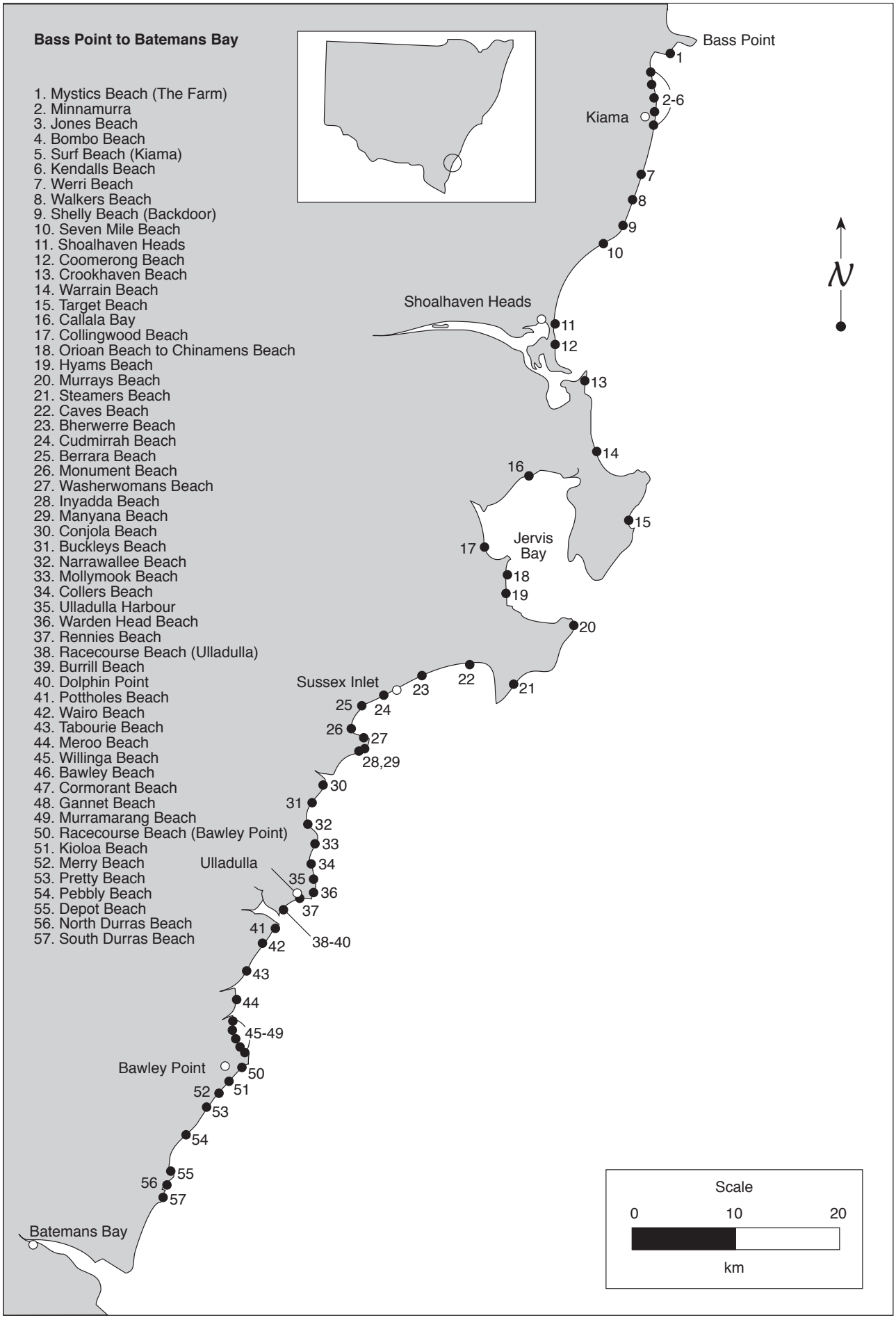
Network members identified three rivers and 11 creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff, septic seepage, landfill leachate, litter and debris.

Public access to beach areas surveyed is, in the main, unrestricted, although parts of Target Beach are restricted for the purposes of a naval bombing range and there are two other beach areas where, according to network members, private property hinders public access.

According to network members there are development proposals affecting 11 of the beach areas surveyed, including five involving housing developments.

Network members use additional comments to highlight a number of issues including: litter; proliferation of Bitu Bush; leachate from landfills; the impacts of stormwater and sewerage.

••• moderately populated: moderate impacts


Bass Point to Batemans Bay
1. Mystics Beach (The Farm)
2. Minnamurra
3. Jones Beach
4. Bombo Beach
5. Surf Beach (Kiama)
6. Kendalls Beach
7. Werri Beach
8. Walkers Beach
9. Shelly Beach (Backdoor)
10. Seven Mile Beach
11. Shoalhaven Heads
12. Coomerong Beach
13. Crookhaven Beach
14. Warrain Beach
15. Target Beach
16. Callala Bay
17. Collingwood Beach
18. Orioan Beach to Chinamens Beach
19. Hyams Beach
20. Murrays Beach
21. Steamers Beach
22. Caves Beach
23. Bherwerre Beach
24. Cudmirrah Beach
25. Berrara Beach
26. Monument Beach
27. Washerwomans Beach
28. Inyadda Beach
29. Manyana Beach
30. Conjola Beach
31. Buckleys Beach
32. Narrawallee Beach
33. Mollymook Beach
34. Collers Beach
35. Ulladulla Harbour
36. Warden Head Beach
37. Rennies Beach
38. Racecourse Beach (Ulladulla)
39. Burrill Beach
40. Dolphin Point
41. Pottholes Beach
42. Wairo Beach
43. Tabourie Beach
44. Meroo Beach
45. Willinga Beach
46. Bawley Beach
47. Cormorant Beach
48. Gannet Beach
49. Murramarang Beach
50. Racecourse Beach (Bawley Point)
51. Kioloa Beach
52. Merry Beach
53. Pretty Beach
54. Pebbly Beach
55. Depot Beach
56. North Durras Beach
57. South Durras Beach
Bass Point
Kiama
Shoalhaven Heads
Jervis Bay
Sussex Inlet
Ulladulla
Bawley Point
Batemans Bay
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Scale
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km

Batemans Bay to NSW/VIC Border

Length of Coastline: 290km (approximate estimate)

Number of Surveys: 59

Coverage: Good

Batemans Bay to the NSW/VIC border takes in the major coastal town of Batemans Bay, Tuross Head, Dalmeny, Narooma, Tathra, Merimbula and Eden together with numerous other coastal settlements including Malua Bay, Mossy Point, Broulee, Bermagui and Pambula. Approximately one quarter of the coastline is held in conservation tenure, the most notable of which are Mimosa Rocks and Ben Boyd national parks; and the Bournda and Nadgee nature reserves.

Network members returned 59 surveys: 53 for individual beaches, five for groups of two or more beaches, and one section survey covering Mullimburra Point to Grey Rocks. Lengths of beach areas surveyed range from 100 metres to 12 kilometres.

According to network members, 15 of the beach areas surveyed are without dunes including four that have lost their dunal system to urban development. Dunal systems range in size from heights of one to 12 metres and widths from five to 250 metres. Network members identified exotic and other non-native flora at 35 of the beach areas surveyed. Species identified include Bitu Bush, Lantana and a variety of grass species.

In total, 27 of the beach areas surveyed are adjacent to, or part of, a designated reserve, including public parks, recreation reserves and conservation reserves.

According to network members, 22 of the beach areas surveyed are located in urban areas and a further 23 have property and/or infrastructure development within 250 metres of the high tide mark.

Network members identified stormwater outlet pipes at 16 of the beach areas surveyed, 11 of which had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter categories evident were plastic bags and plastic bottles.

Network members identified seven sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Batemans Bay, Tomakin, Moruya, Kianga, Bermagui, Merimbula and Eden. All seven are tertiary treated effluent and all but one discharge directly to the ocean. There is effluent re-use from five of these systems. Re-use is for the purposes of irrigation of sporting fields, golf courses and the like.

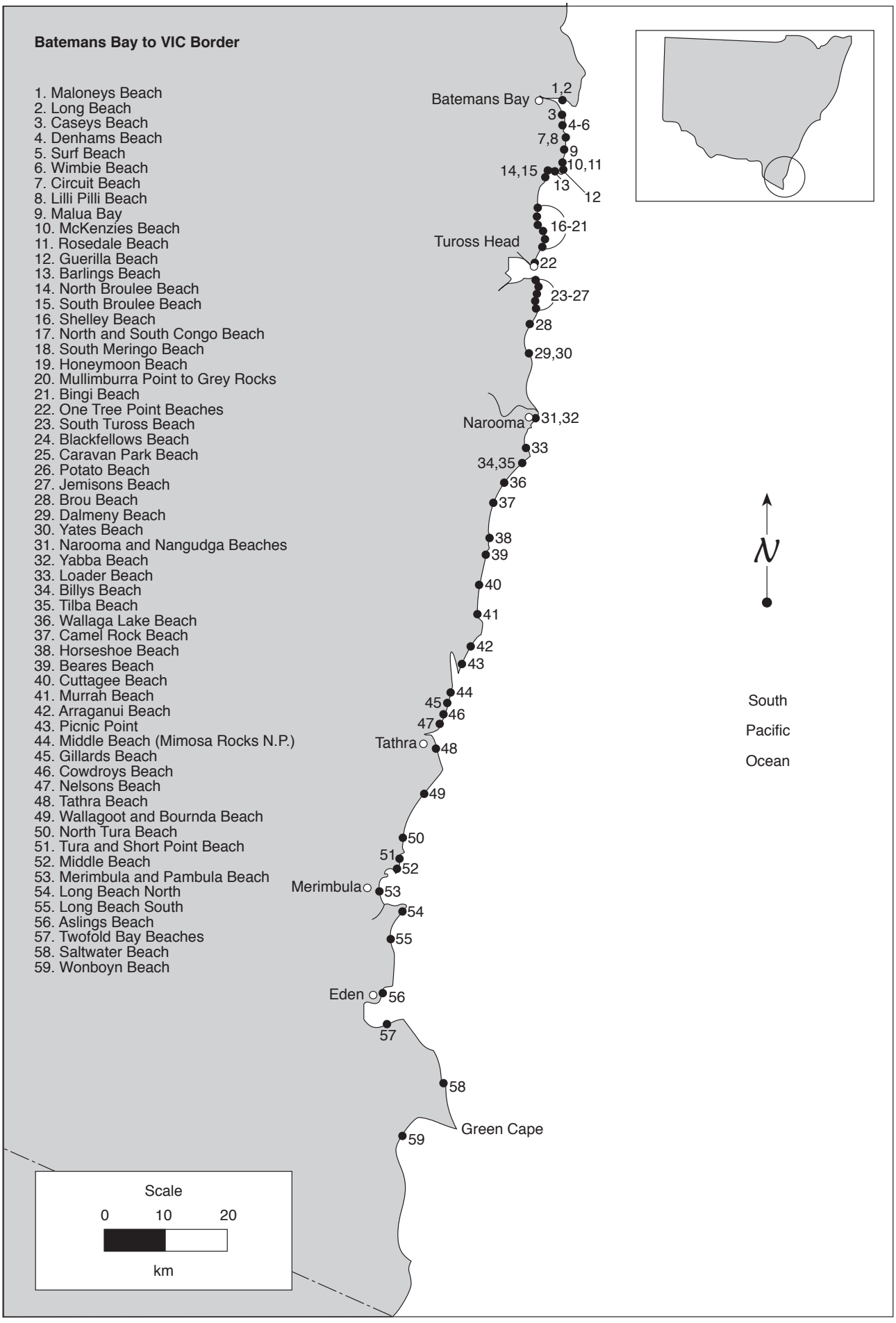
Network members identified five rivers and 11 creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff, litter and debris.

Public access to the beach areas surveyed is, in the main, unrestricted although network members note seven beach areas where access is hindered by private property.

Network members identified development proposals affecting nine of the beach areas surveyed, including five involving housing development.

Network members use additional comments to highlight a number of issues including: litter; the impacts of pedestrian traffic and four wheel drives on dunal areas; increasing incidence of exotic and other non-native flora species.

••• 1/2 moderately populated in places: generally low impacts


Batemans Bay to VIC Border
1. Maloneys Beach
2. Long Beach
3. Caseys Beach
4. Denhams Beach
5. Surf Beach
6. Wimbie Beach
7. Circuit Beach
8. Lilli Pilli Beach
9. Malua Bay
10. McKenzies Beach
11. Rosedale Beach
12. Guerilla Beach
13. Barlings Beach
14. North Broulee Beach
15. South Broulee Beach
16. Shelley Beach
17. North and South Congo Beach
18. South Meringo Beach
19. Honeymoon Beach
20. Mullimburra Point to Grey Rocks
21. Bingi Beach
22. One Tree Point Beaches
23. South Tuross Beach
24. Blackfellows Beach
25. Caravan Park Beach
26. Potato Beach
27. Jemisons Beach
28. Brou Beach
29. Dalmeny Beach
30. Yates Beach
31. Narooma and Nangudga Beaches
32. Yabba Beach
33. Loader Beach
34. Billys Beach
35. Tilba Beach
36. Wallaga Lake Beach
37. Camel Rock Beach
38. Horseshoe Beach
39. Beares Beach
40. Cuttagee Beach
41. Murrah Beach
42. Arraganui Beach
43. Picnic Point
44. Middle Beach (Mimosa Rocks N.P.)
45. Gillards Beach
46. Cowdroys Beach
47. Nelsons Beach
48. Tathra Beach
49. Wallagoot and Bournda Beach
50. North Tura Beach
51. Tura and Short Point Beach
52. Middle Beach
53. Merimbula and Pambula Beach
54. Long Beach North
55. Long Beach South
56. Aslings Beach
57. Twofold Bay Beaches
58. Saltwater Beach
59. Wonboyn Beach
Batemans Bay
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Tuross Head
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23-27
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29,30
Narooma
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34,35
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Tathra
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Merimbula
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Eden
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Green Cape
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Norfolk Island

Length of Coastline: 25km (approximate estimate)

Number of Surveys: 4

Coverage: Reasonable

Norfolk Island is located approximately 1500 kilometres north-east of Sydney and is actually closer to New Zealand than it is to Australia. The island has a small resident population and is a popular tourist destination.

Network members returned four surveys providing data on Cemetary Bay, Emily Bay, Creswell Bay and Anson Bay.

Cemetary Bay and Emily Bay have small dunal areas vegetated by native grass and shrub species, Anson Bay is located at the bottom of a cliff and Creswell Bay backs onto a native pine forest that forms part of a national park.

Located adjacent to Cemetary Bay and Emily Bay is the township of Kingston. Infrastructure development associated with Kingston infringes to within 50 metres of the high tide mark at both beaches. In addition there is a golf course and cemetary located immediately adjacent to Cemetary Bay. Cresswell Bay is free from residential or commercial development but has a dirt track and toilet block adjacent. Anson Bay has a small township of the same name located just south of the beach area.

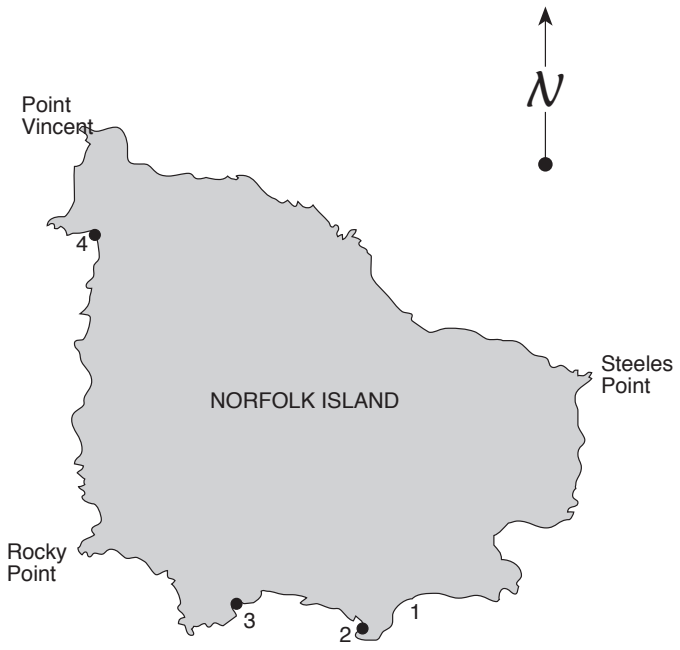
According to network members there are no stormwater outlet pipes at beach areas surveyed. The island does, however, have a sewerage system that services the township of Lone Pine and discharges secondary treated effluent through an outfall at Headstone Point. The rest of the island is serviced by septic tanks.

Headstone Point is also the location of the islands refuse dump. According to network members refuse management practices are as follows: paper, plastic, cardboard, tin cans, and other combustibles are burnt then discharged through a chute into the ocean; bottles are smashed and thrown over the side of the cliff; old cars, boat bodies, white goods are similarly discharged. Local divers report that these items, including the car bodies, are transported from the dumping site by underwater currents.

According to network members litter is the biggest problem affecting island beaches and there are bits of refuse evident throughout the coastline including burnt plastic, smashed glass, cans and various other bits and pieces.

••• 1/2 sparsely populated: generally low impacts

Norfolk Island



1. Cemetary Bay
2. Emily Bay
3. Bumboras Beach (Creswell Bay)
4. Anson Bay

Scale
0 10 20
km

Lord Howe Island

Length of Coastline: 35km (approximate estimate)

Number of Surveys: 9

Coverage: Very good

Lord Howe Island is located approximately 490 kilometres due east of Port Macquarie and is the largest island in New South Wales. Most of the beaches are located along the north half of the east and west coasts. The southern half is mostly rugged mountainous peaks with shear cliffs dropping to the ocean. There is a small resident population of approximately 300 and tourist numbers are restricted to 400 at any one time.

Network members returned nine surveys, all of which are for individual beaches. Lengths of beach areas surveyed range from 250 metres to two kilometres.

All but one of the beach areas surveyed retain a dunal system, the exception being Middle Beach which is located at the bottom of a cliff. Dunes generally average one to four metres in height and three to six metres in width, although Blinky Beach has dunes up to 10 metres high and 50 metres wide.

According to network members, three of the beach areas surveyed are zoned for environmental protection. Other zones include recreation, special lease and rural.

According to network members, none of the beach areas surveyed are located in urban areas, although there are residential and commercial developments adjacent to Johnsons Beach, Lagoon Beach and Old Settlement Beach.

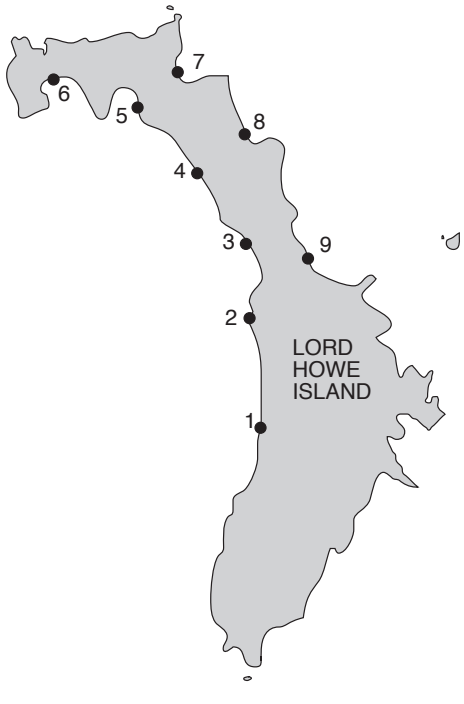
Network members did not identify any stormwater outlets at beach areas surveyed nor is there a sewerage outfall discharging in the vicinity of beach areas surveyed. Residential areas are serviced by septics.

Network members identified two creeks as sources of beach pollution via their respective catchments. Each is said to be affected by agricultural runoff from adjacent farming property. Septic seepage is also noted as being a minor problem in some areas.

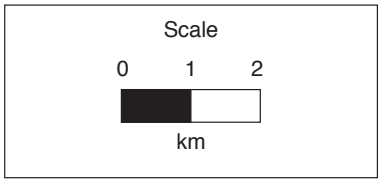
Network members indicate that dune stabilisation problems at Windy Point Road and Lagoon Beach are being addressed through erosion control programs.

•••• sparsely populated: low impacts

Lord Howe Island



1. Salmon Beach
2. Johnsons Beach
3. Cobbys Corner
4. Lagoon Beach
5. Old Settlement Beach
6. North Bay
7. Neds Beach
8. Middle Beach
9. Blinky Beach



3.4 Victoria

Victoria has a coastline, including major islands, of approximately 2000 kilometres[14]. Along the mainland coast there are around 734 beaches including 146 inside Port Phillip Bay[4]. The survey targeted all areas of the mainland coast and Phillip Island.

Network members returned 227 surveys providing data on 196 mainland beach areas and 31 island beach areas. Of the surveys, 208 are for individual beaches, three are for groups of two or more beaches, and 16 are for beach areas between two geographic points.

According to network members, 87 (38 per cent) of the beach areas surveyed are without dunes including 16 that have lost their dunal system to urban development. Network members identified exotic and other non-native flora at 78 (34 per cent) of the beach areas surveyed. Species identified tended to be common knowledge species like Blackberries, Boxthorn and Marram grass. Other species identified include New Zealand Sperge, Caprosma, Wandering Jew and Milkweed amongst others.

According to network members, 73 (32 per cent) of the beach areas surveyed are located in urban areas and 186 (80 per cent) have property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at 60 (26 per cent) of the beach areas surveyed, 45 of which had litter evident in the vicinity of pipe discharge at the time of survey. The four most common litter categories evident were plastic bags (60 per cent), food wrappers (49 per cent), PET/ plastic bottles (49 per cent) and cans (38 per cent).

Network members identified 16 public sewerage outfalls discharging in the vicinity of beach areas surveyed. All but one discharge directly to the ocean and treatment standards vary: nine discharge secondary treated effluent, three discharge primary treated effluent and four discharge screened effluent. Effluent re-use occurs from only one of these systems and the outfalls have a combined discharge of approximately 650 million litres of effluent per day.

Network members listed 49 water courses, including 15 rivers and 28 creeks, as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff (73 per cent), urban runoff (61 per cent), litter and debris (31 per cent).

Litter was evident at approximately 80 per cent of the beach areas surveyed. The four most common litter categories evident were cigarette butts (76 per cent), food wrappers (72 per cent) and plastic bags (59 per cent).

Network members identified only one mining operation at beach areas surveyed: a sandmine located at Levys Beach on the west coast.

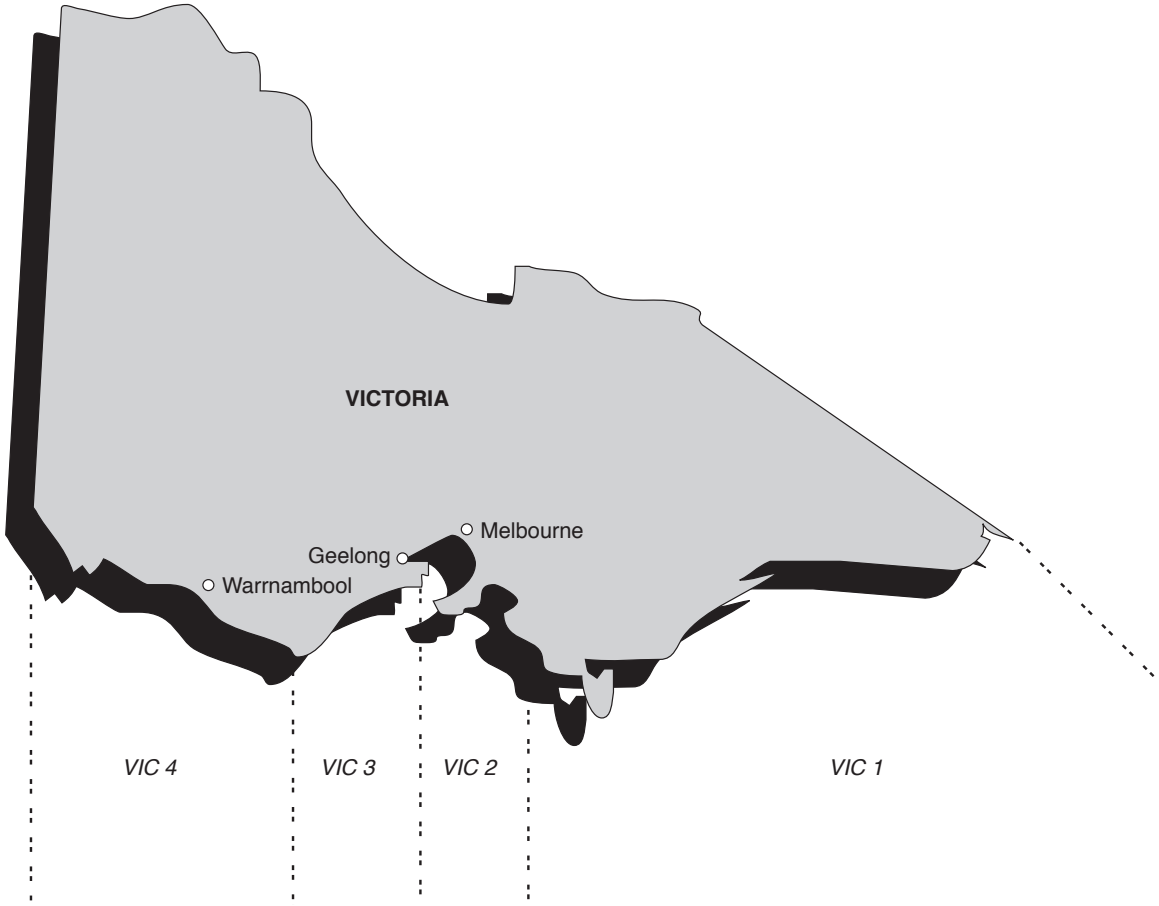
Network members identified development proposals affecting 43 (19 per cent) of the beach areas surveyed including 15 involving housing development, five involving resort development and four involving canal/ marina development.

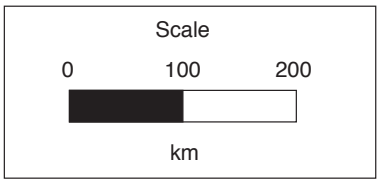
Public access to beach areas surveyed is, in the main, unrestricted, although network members note four beach areas where access is hindered by private property.

Network members use additional comments to highlight a number of issues and these are noted in the regional summaries.

Victorian coastal regions

VIC 1. NSW border to Point Smythe
VIC 2. Point Smythe to Barwon Heads
VIC 3. Barwon Heads to Cape Otway
VIC 4. Cape Otway to SA border





NSW border to Point Smythe

Length of Coastline: 560km (approximate estimate)

Number of Surveys: 63

Coverage: Reasonable

The New South Wales border to Point Smythe is a sparsely populated coastline dominated by major barrier beaches (including Ninety Mile Beach) that enclose numerous lakes, lagoons and estuaries. Nearly 50 per cent of the coastline is held in conservation tenure, the most notable of which are the Croajingolong, Lakes and Wilson Promontory national parks. Urban settlements on the coast include Mallacoota, Lakes Entrance, Bemm River, Marlo, Port Welshpool, Port Franklin and Venus Bay. The Tasman Sea just offshore from Seaspray is home to more than 12 oil and gas platforms. These platforms are located between 25 and 80 kilometres offshore and tap into the rich streams of the Bass Strait oil and gas reserves. The Wilsons Promontory national park protects approximately 48 900 hectares of rugged coastal bushland and approximately160 kilometres of coastline. Most of the beaches inside the National Park can only be accessed by boat or foot.

Network members returned 63 surveys providing reasonable coverage of the region. Of the surveys, 61 are for individual beaches, one is a group survey covering the Nooramunga Barrier Islands and one is a section survey covering Five Mile Beach to Point Smythe.

All but six of the beach areas surveyed have a dunal system, the exceptions being Walkerville Beach and five beach areas inside the Corner Inlet. Network members identified exotic and other non-native flora at 17 of the beach areas surveyed. Species identified include New Zealand Sperge, Bracken Fern, and Blackberry.

According to network members 11 of the beach areas surveyed are within urban areas and a further 34 have road access to within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at only two of the beach areas surveyed, none of which had litter evident in the vicinity of pipe discharge at the time of survey.

Network members identified six public sewerage outfalls discharging in the vicinity of beach areas surveyed. These outfalls are located at Bairnsdale, Delray Beach, Port Welshpool, Toora, Foster and Venus Bay. In addition there is an outfall located at McGaurans Beach that discharges cooling water from the Latrobe Valley Power Stations. This waste water does not receive treatment before discharge but is closely monitored for concentrations of heavy metals and other restricted substances. Of the six public sewerage outfalls identified: all but one discharge to the ocean, the exception being the Bairnsdale outfall which discharges into the Mitchell River via an artificial wetland; and all but one discharge secondary treated effluent, the exception being the Venus Bay outfall which discharges primary treated effluent.

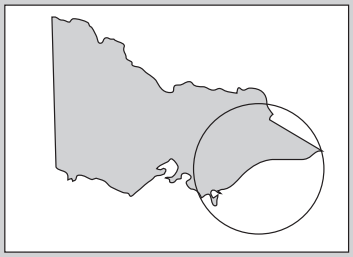
Public access to the beach areas surveyed is unrestricted, although an entry fee is payable to access beaches within the Wilson Promontory national park.

Network members indicate that litter is the biggest problem affecting beaches in the region and note a high incidence of bait packets and other fishing related debris. Also evident is litter washed ashore from offshore sources including fishing boats and shipping vessels.

•••• sparsely populated/low impacts

NSW border to Point Smythe

1. Mallacoota Beach
2. Quarry Beach
3. Shipwreck Creek Beach
4. Wingan Beach
5. Thurra Beach
6. East Cape Beach
7. Salmon Rocks Beach
8. Point Ricardo
9. Corringle Beach
10. Pettmans Beach
11. Lake Tyers Beach
12. Shelly Beach
13. Lake Bunga Beach
14. Eastern Beach
15. Surf Beach
16. Loch Sport Beach
17. South Loch Sport Beach
18. Paradise Beach
19. Golden Beach
20. Delray Beach
21. The Wreck Beach
22. Flamingo Beach
23. Glomar Beach
24. North Honeysuckles Becah
25. South Honeysuckles Beach
26. Seaspray Beach
27. South Seaspray Beach
28. McGaurans Beach
29. Woodside Beach
30. Reeves Beach
31. McLoughlins Beach
32. Manns Beach
33. Robertsons Beach
34. Nooramunga Barrier Islands
35. Toora Beach
36. Barry Beach
37. Foster Beach
38. Yanakie Beach
39. Entrance Beach
40. Hunter Beach
41. Three Mile Beach
42. Johnny Souey Cove
43. Miranda Bay
44. Five Mile Beach
45. Sealers Cove
46. Refuge Cove
47. Larkin Cove
48. Bare Back Cove
49. North Waterloo Bay
50 Waterloo Bay
51. Oberon Bay
52. Little Oberon Bay
53. Norman Bay
54. Squeaky Beach
55. Picnic Bay
56. Whiskey Bay
57. Darby Bay
58. Cotters Beach
59. Sandy Point
60. Waratah Bay
61. Walkerville Beach
62. Morgans Beach
63. Five Mile Beach (Venus Bay)



Point Smythe to Barwon Heads

Length of Coastline: 350km (approximate estimate)

Number of Surveys: 73

Coverage: Good

Point Smythe to Barwon Heads takes in the twin inlets of Western Port Bay and Port Phillip Bay. Western Port Bay consists predominately of mangroves and mudflats on shores protected by the French and Phillip Islands. Port Phillip Bay, on the other hand, has 146 beaches along its shoreline and is home to the city of Melbourne. The only notable conservation reserve on the mainland coast is the Point Nepean National Park which protects the ocean side of the Mornington Peninsula.

Network members returned 73 surveys providing good coverage of beach areas along all but the west coast of Port Phillip Bay. All but one of the surveys are for individual beaches, the exception being a group survey for the beaches of Frankston.

According to network members, 34 of the beach areas surveyed are without dunes. Of these, the majority are located in Port Phillip Bay. Network members identified exotic and other non-native flora at 17 of the beach areas surveyed. Species identified include Marram grass, Caprosma, Blackberries, Boneseed, Polygala, Smilax, Capeweed, Ragwort and Wandering Jew.

According to network members 41 of the beach areas surveyed are located in urban areas and, in places, development often infringes to within 50 metres of the high tide mark. A further 20 beach areas have road access to within 250 metres of the high tide mark.

Network members identified stormwater outlet pipes at 38 of the beach areas surveyed, 35 of which had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter categories evident were plastic bags and food wrappers.

Network members identified three public sewerage outfalls discharging in the vicinity of beach areas surveyed. These outfalls are located at Baxters Beach (Wonthaggi), Boags Rock (Gunnamatta Beach) and Black Rock (13th Beach) and discharge directly to the ocean. The Boags Rock and Black Rock outfalls service, between them, the majority of Melbourne's domestic and industrial sewage and discharge approximately one billion litres of effluent per day. The Boags Rock outfall discharges secondary treatment effluent, the Black Rock outfall screened effluent. The outfall at Baxters Beach is much smaller in comparison, discharging approximately 20 million litres per day peak season. Network members note that there is also an emergancy outfall located at Eagles Nest Beach but this is rarely, if ever, used.

Network members identified four rivers and 11 creeks as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff, urban runoff, litter and debris.

Public access to the beach areas surveyed is, in the main, unrestricted, although network members note two beach areas where public access is hindered by private property.

Litter was evident at the majority of beach areas surveyed. The most common litter categories evident were cigarette butts, food wrappers, plastic bags and PET/plastic bottles.

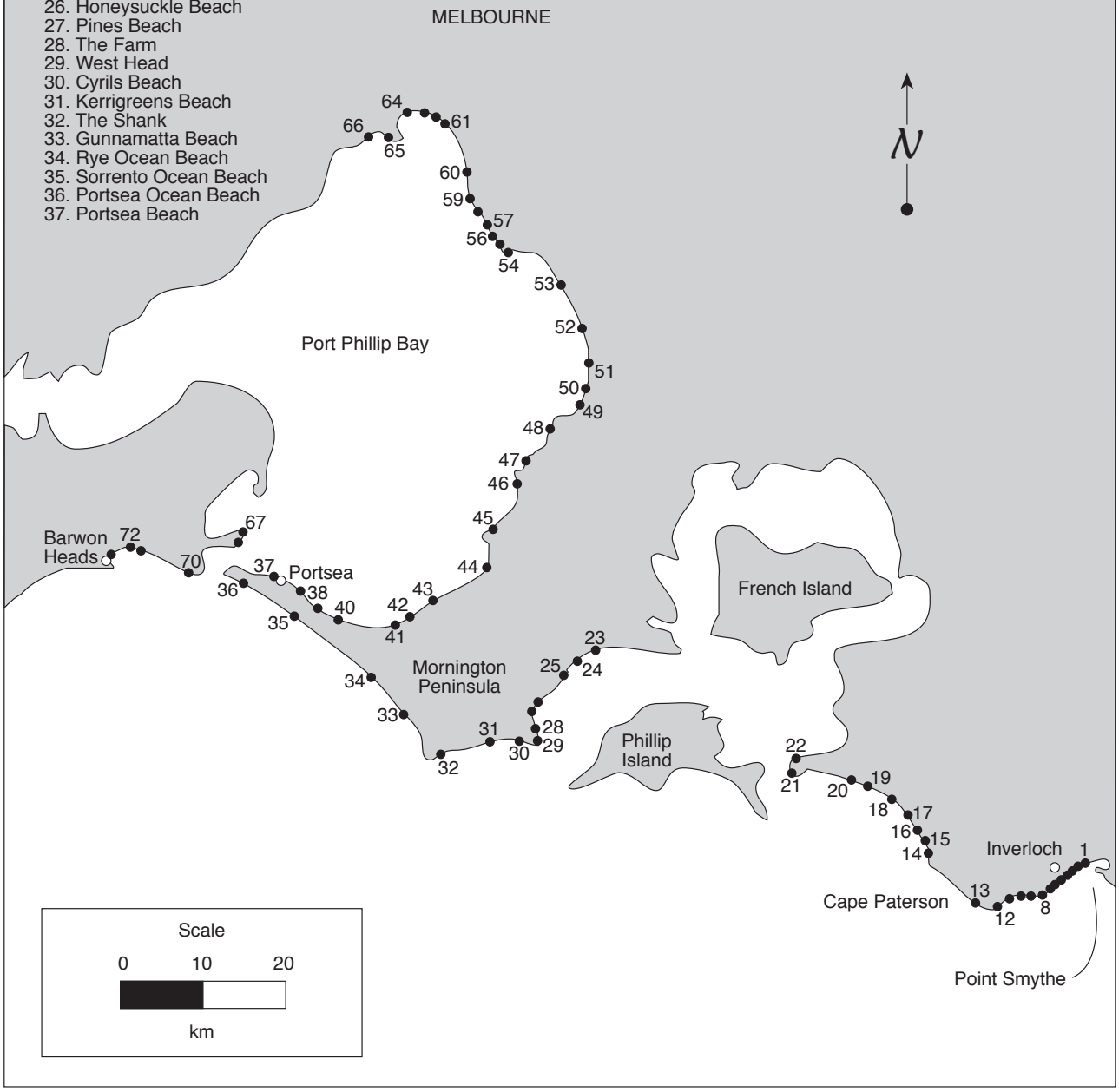
Network members identified development proposals affecting 13 of the beach areas surveyed, five involving housing developments. Other proposals include the Cribb Point oil terminal, a development that is opposed by many in the community because of the environmental risks involved.

Network members use additional comments to highlight a number of issues including: the risks associated with port activities and shipping inside Western Port Bay; litter from both onshore and offshore sources; health risks and environmental impacts associated with the Boags Rocks and Black Rock sewerage outfalls.

- •• heavily populated in parts: moderate to high impacts

Point Smythe to Barwon Heads

1. The Inlet Beach
2. Main Beach (Inverloch)
3. Flat Rocks
4. The Caves
5. Spot X
6. Eagles Nest Beach
7. Shack Bay
8. Twin Reefs
9. The Oaks
10. Undertow Bay
11. The Bay
12. First Surf Beach
13. Second Surf Beach
14. Harmers Haven
15. Cuttlers Beach
16. Baxters Beach
17. Williamsons Beach
18. Powlett Beach
19. Kilcunda Beach
20. Black Head Beach
21. Griffith Point Beach
22. San Remo Beach
23. Somers Beach
24. Balnarring Point
25. Point Leo
26. Honeysuckle Beach
27. Pines Beach
28. The Farm
29. West Head
30. Cyrils Beach
31. Kerrigreens Beach
32. The Shank
33. Gunnamatta Beach
34. Rye Ocean Beach
35. Sorrento Ocean Beach
36. Portsea Ocean Beach
37. Portsea Beach
38. Sorrento Beach
39. Blairgowrie Beach
40. Rye Beach
41. Rosebud Beach
42. McCrae Beach
43. Dromana Beach
44. Safety Beach
45. Mount Martha Beach
46. Balcombe Beach
47. Mornington Beach
48. Mount Eliza Beach
49. Frankston Beaches
50. Seaford Beach
51. Carrum Beach
52. Edithvale Beach
53. Mordialloc Beach
54. Ricketts Point
55. Black Rock Beach
56. Half Moon Bay
57. Sandringham Beach
58. Hampton Beach
59. Brighton Beach
60. Elwood Beach
61. St Kilda Beach
62. Middle Park Beach
63. South Melbourne Beach
64. Port Melbourne Beach
65. Williamstown Beach
66. Altona Beach
67. Front Beach (Queenscliff)
68. Back Beach (Queenscliff)
69. Front Beach (Port Lonsdale)
70. Back Beach (Port Lonsdale)
71. Collendina Beach
72. Main Beach (Ocean Grove)
73. Raffs Beach



Barwon Heads to Cape Otway

Length of Coastline: 150km (approximate estimate)

Number of Surveys: 32

Coverage: Very good

Barwon Heads to Cape Otway is one of Australia's most celebrated stretches of coastline. The combination of spectacular scenery and magnificent surfing beaches attract visitors from throughout Australia and around the world. Coastal settlements first established as farming, fishing and timber communities are becoming increasingly popular holiday destinations. Best known are Torquay, Anglesea and Lorne; others include Aireys Inlet, Wye River, Skenes Creek, Appollo Bay and Marengo. Approximately one quarter of the coastline is held in conservation tenure, the most notable of which are the Angahook-Lorne state park and the Otway national park.

In total there were 32 surveys returned providing good coverage of the region. Of these,17 are for individual beach areas, 14 are section surveys covering beach areas between two geographical locations, and one is a group survey covering Winki Pop and Bells Beach.

The majority of beach areas surveyed are located amongst rocky outcrops or at the base of cliffs and do not have dunal systems. Dunes exist at only 12 of the beach areas surveyed and range in heights from one to 10 metres, and widths from four to 100 metres. Network members identified exotic and other non-native flora at 10 of the beach areas surveyed. Species identified include Milkweed, Ragwort, Flatweed, Coprosma, Boneseed, Blackberries and Daisies.

According to network members, 12 of the beach areas surveyed are located in urban areas. Of these, there are seven where development infringes to within 100 metres of the high tide mark. Network members identified stormwater outlet pipes at nine of the beach areas surveyed, seven of which had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter categories evident were plastic bags and PET/plastic bottles.

There are four sewerage outfalls discharging to the ocean in the vicinity of beach areas surveyed. These are located at Black Rock, Anglesea, Lorne and Appollo Bay. The Black Rock outfall services Melbourne's Western Treatment plant and discharges approximately 55 million litres of screened effluent per day. Local surfers, fishers and other beach goers have been campaigning for a number of years to have the outfall closed in the interests of public health, or at the very least upgraded to a better level of treatment.

Network members identified four rivers and six creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff, litter and debris.

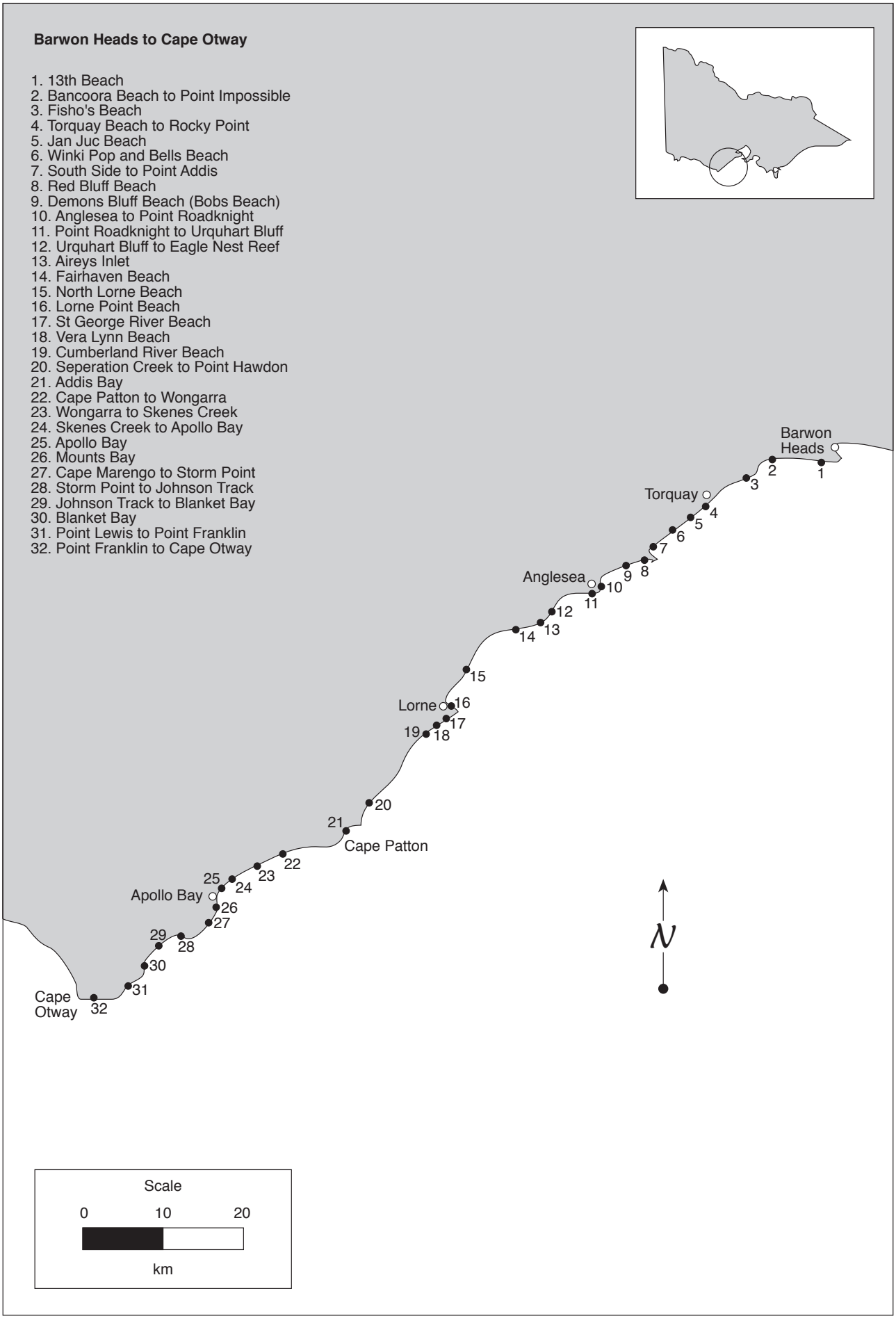
Public access to beach areas surveyed is, in the main, unrestricted, although network members note one beach area, Cape Marengo to Storm Point, where public access is hindered by private property.

Litter was evident at all but two of the beach areas surveyed. The four most common litter categories evident were plastic bags, bottles, food wrappers and cans.

Network members identified development proposals affecting 12 of the beach areas surveyed, six involving housing development. Other proposals noted include a marina and resort at Fisho's Beach near Torquay.

Network members use additional comments to highlight a number of issues including: litter; the high incidence of exotic and other non-native flora species; health risks and impacts associated with sewerage outfalls.

••• moderately populated: moderate impacts


Barwon Heads to Cape Otway
1. 13th Beach
2. Bancoora Beach to Point Impossible
3. Fisho's Beach
4. Torquay Beach to Rocky Point
5. Jan Juc Beach
6. Winki Pop and Bells Beach
7. South Side to Point Addis
8. Red Bluff Beach
9. Demons Bluff Beach (Bobs Beach)
10. Anglesea to Point Roadknight
11. Point Roadknight to Urquhart Bluff
12. Urquhart Bluff to Eagle Nest Reef
13. Aireys Inlet
14. Fairhaven Beach
15. North Lorne Beach
16. Lorne Point Beach
17. St George River Beach
18. Vera Lynn Beach
19. Cumberland River Beach
20. Seperation Creek to Point Hawdon
21. Addis Bay
22. Cape Patton to Wongarra
23. Wongarra to Skenes Creek
24. Skenes Creek to Apollo Bay
25. Apollo Bay
26. Mounts Bay
27. Cape Marengo to Storm Point
28. Storm Point to Johnson Track
29. Johnson Track to Blanket Bay
30. Blanket Bay
31. Point Lewis to Point Franklin
32. Point Franklin to Cape Otway
Barwon Heads
Torquay
Anglesea
Lorne
Cape Patton
Apollo Bay
Cape Otway
N
Scale
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10
20
km

Cape Otway to SA border

Length of Coastline: 400km (approximate estimate)

Number of Surveys: 29

Coverage: Reasonable

Cape Otway to the South Australian border is a rugged and sparsely populated coastline, one third of which is held in conservation tenure including the Port Campbell national park and Discovery Bay coastal park. Elsewhere, the coastline is dominated by grazing properties. Coastal settlements including Warrnambool and Portland.

Network members returned 29 surveys providing good coverage of the accessible beaches. Areas not covered were either inaccessible or locked up behind private farming property. All of the surveys returned are for individual beaches and beach lengths range from 250 metres to 50 kilometres.

According to network members, 13 of the beach areas surveyed are without dunes. Where dunes exist they can be quite extensive in size with heights to 50 metres and widths to 1000 metres. Network members identified exotic and other non-native flora at 15 of the beach areas surveyed. Species identified include Marram grass and Boxthorn.

Only seven of the beach areas surveyed are located in urban areas, although a further 18 have road access to within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at only one of the beach areas surveyed. Litter evident in the vicinity of pipe discharge at the time of survey include plastic bags, cigarette butts and food wrappers.

Network members identified three public sewerage outfalls discharging in the vicinity of the beach areas surveyed. These are located at Thunder Point (Warrnambool), Griffith Island (Port Fairy) and Bald Hill (Portland) and discharge directly to the ocean. Each of the three is discharging screeened effluent, although Warrnambool is being upgraded to secondary treatment.

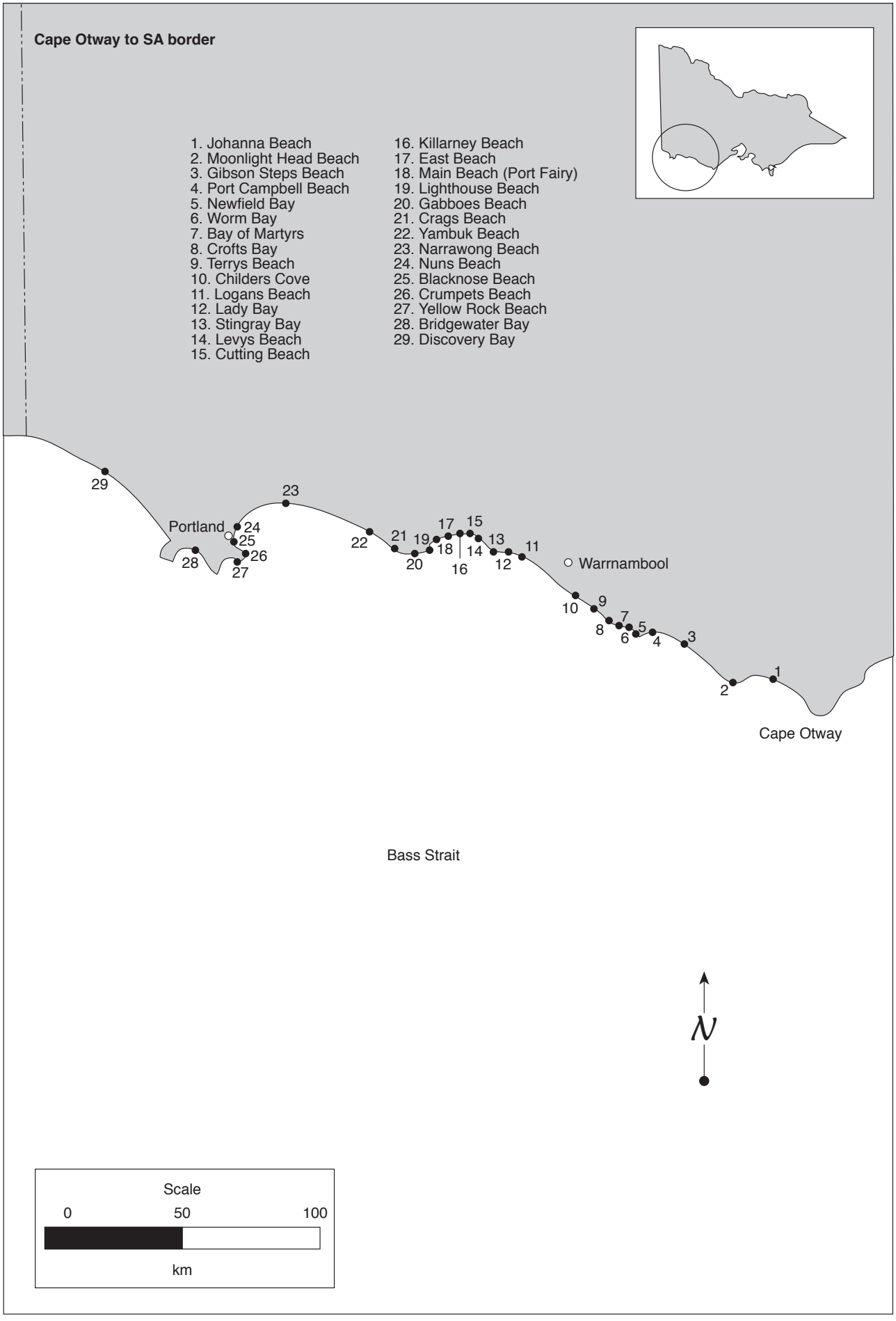
Network members identified five rivers and three creeks as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff, urban runoff, sewage effluent, litter and debris.

According to network members the majority of beach areas surveyed are generally free of litter although Port Fairy beaches are said to be trashed fairly regularly by bus-loads of fishers who travel to the area from Melbourne and usually leave all sorts of garbage behind, including bait bags, fish gut, bottles and cans.

Network members identified development proposals affecting 10 of the beach areas surveyed, including three involving housing development. Other proposals include a plan to upgrade sewerage treatment at Warrnambool. Local surfers, fishers, and other beach-goers are upset that options for this upgrade do not include effluent re-use or land disposal options

Network members use additional comments to highlight a number of issues including: inadequate levels of sewerage treatment; litter left behind by campers and travelling surfers/fishers; impacts associated with professional and amateur surfing contests and the lack of community consultation by contest organisers.

••• moderately populated in parts: generally low impacts


Cape Otway to SA border
1. Johanna Beach
2. Moonlight Head Beach
3. Gibson Steps Beach
4. Port Campbell Beach
5. Newfield Bay
6. Worm Bay
7. Bay of Martyrs
8. Crofts Bay
9. Terrys Beach
10. Childers Cove
11. Logans Beach
12. Lady Bay
13. Stingray Bay
14. Levys Beach
15. Cutting Beach
16. Killarney Beach
17. East Beach
18. Main Beach (Port Fairy)
19. Lighthouse Beach
20. Gabboes Beach
21. Crags Beach
22. Yambuk Beach
23. Narrawong Beach
24. Nuns Beach
25. Blacknose Beach
26. Crumpets Beach
27. Yellow Rock Beach
28. Bridgewater Bay
29. Discovery Bay
Portland
Warrnambool
Cape Otway
Bass Strait
N
Scale
0
50
100
km

Phillip Island

Length of Coastline: 60km (approximate estimate)

Number of Surveys: 30

Coverage: Very good

Phillip Island is located at the mouth of Western Point Bay and is connected to the mainland at San Remo by a 640 metre bridge. Land-use is dominated by grazing properties. Settlements include Cowes, Ventnor, Rhyll and New Haven. There are a number of significant wildlife habitats including that for muttonbirds along the cliffs of Cape Woolamai, koala habitat to the south-east and south-west of Cowes, and penguin reserves on beaches to the western extremities of the island.

Network members returned 30 surveys providing good coverage of the island. The only beach areas not covered by the survey are generally inaccessible. All but one of the surveys are for individual beaches, the exception being a section survey covering Red Rocks to West Cowes.

According to network members,13 of the beach areas surveyed are without dunes, the majority because they are located at the base of cliffs. Dunes vary in size throughout the island. The largest, at up to 40 metres high and 3000 metres wide, are located at Woolamai Beach where they span the width of the Woolamai peninsula. Network members identified exotic and other non-native flora at 19 of the beach areas surveyed. Species identified include Marram grass, Boxthorn, and Kikuyu.

According to network members only two of the beach areas surveyed are located in urban areas, although 19 have houses to within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at 10 of the beach areas surveyed, two of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include plastic bags and food wrappers.

The island has a sewerage treatment plant which discharges secondary treated effluent to the ocean through an outfall at Pyramid Rock. This plant has, reportedly, reached it's design capacity and needs upgrading.

Network members identified eight creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff and agricultural runoff.

Public access to beach areas surveyed is, in the main, unrestricted, although the penguin reserves are closed during daylight hours.

There was litter evident at the majority of beach areas surveyed. The most common litter categories evident were food wrappers and flotsam/jetsam.

Network members identified development proposals affecting seven of the beach areas surveyed including one involving housing development and two involving resort development.

Network members use additional comments to highlight a number of issues including the threat of oil spills from shipping into, and out of, Western Port Bay. According to network members there have been a number of small spills in the past, and these have impacted on penguins and other wildlife. Other issues include beach erosion and cliff erosion resulting from poorly sited residential development. Property owners contribute to the problem by chopping down trees for view.

••• moderately populated: moderate impacts

Phillip Island

1. Ventnor Beach
2. Anchorage Beach
3. Red Rocks to West Cowes
4. Cowes Beach
5. Silverleaves Beach
6. Rhyll Beach
7. Newhaven North Beach
8. Woody Point / Newhaven Jetty
9. Cleeland Bight
10. Safety Beach (Woolamai)
11. Surf Beach (Woolamai)
12. Ocean Beach
13. Shit Can Alley
14. Forrest Caves Beach
15. Surf Beach
16. Sunderland Bay
17. Sunderland Bluff (Express Point)
18. Smiths Beach
19. YCW Beach
20. Pyramid Rock
21. Berrys Beach
22. Kitty Miller Bay
23. Summerland Beach
24. The Nobbies
25. Cowrie Beach
26. Shelley Beach
27. Cat Bay
28. Farm Beach
29. Woolshed Bight
30. Grossard Point

3.5 South Australia

South Australia has a coastline, including major islands, of approximately 3700 kilometres[14]. Along the mainland coast there are around 1100 beaches[4]. The survey targeted all areas of the mainland coast and Kangaroo Island.

Network members returned 218 surveys providing data on 185 mainland beach areas and 33 island beach areas. Of the surveys, 199 are for individual beaches, nine are for groups of two or more beaches and 10 are for beach areas between two geographic points.

According to network members, 90 (41 per cent) of the beach areas surveyed are without dunes including 14 that have lost their dunal system to urban development. Network members identified exotic and other non-native flora at 30 per cent of the beach areas surveyed. Species identified are mainly common knowledge species like Boxthorn, Kikuyu, Couch and Marram grass. Other species identified include Caprosma, Geraniums, Bridal Creeper and African Daisy.

According to network members, 51 (23 per cent) of the beach areas surveyed are located in urban areas and 132 (60 per cent) have some form of property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at 34 (16 per cent) of the beach areas surveyed, 21 of which had litter evident in the vicinity of pipe discharge at the time of survey. The four most common litter categories evident were plastic bags (86 per cent), food wrappers (81 per cent), cigarette butts (71 per cent) and PET/plastic bottles (38 per cent).

Network members identified 12 public sewerage outfalls discharging in the vicinity of beach areas surveyed. All but one of these discharge directly to the ocean and treatment standards vary: seven discharge secondary treated effluent or better, three discharge primary treated effluent, and two discharge screened effluent. Effluent re-use occurs regularly from three of these systems and the outfalls have a combined discharge of approximately 450 million litres per day.

Network members listed 37 water courses, including 15 rivers and 18 creeks, as possible sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff (92 per cent), urban runoff (54 per cent), and litter/debris (57 per cent).

There was litter evident at approximately 75 per cent of the beach areas surveyed. The four most common litter categories evident were cigarette butts (79 per cent), plastic bags (73 per cent), bottles (69 per cent) and flotsam/jetsam (61 per cent).

There were no mining operations identified at beach areas surveyed, although network members note a proposal to mine deposited seagrasses in a mangrove area of the Spit to Schlink Landing on the west coast of the Eyre Peninsula.

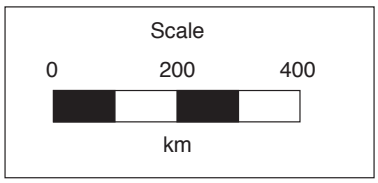
Network members identified development proposals affecting 31 (14 per cent) of the beach areas surveyed including 11 involving housing development, three involving marina or canal development and one involving resort development.

Public access to beach areas surveyed is, in the main, unrestricted, although network members note 20 beach areas where access is hindered by private property. A further six beaches are, according to network members, closed to the public because of private property.

Network members use additional comments to highlight a number of issues and these are covered in the regional summaries.

South Australia coastal regions

SA 1. VIC border to Goolwa
SA 2. Murray Mouth to Port Wakefield
SA 3. Port Wakefield to Point Bolingbroke
SA 4. Point Bolingbroke to WA border



VIC border to the Murray Mouth

Length of Coastline: 440 km (approximate estimate)

Number of Surveys: 21

Coverage: Reasonable

The Victorian border to the Murray Mouth is a sparsely populated coastline dominated by major barrier beaches and numerous lakes, lagoons and wetlands. The region is a haven for waders and waterbirds such as the Hooded Plover and much of the coastline is held in conservation tenure including the Canunda and Coorong national parks. The Coorong national park encompasses the 136 kilometre Younghusband Peninsula and Coorong Lagoon. Mt Gambier and Millicent, located just inland from the coastline, are the largest settlements in this region. Other coastal settlements include Port MacDonnell, Beachport, Robe, and Kingston S.E.

Network members returned 21 surveys: 18 for individual beaches and three group surveys. Lengths of beach areas surveyed range from 100 metres to the 136 kilometre Coorong Beach. Coverage is intermittant but reasonable given the remote nature of much of this coastline.

All but one of the beach areas surveyed have a dunal system, the exception being Johns Joke Beach which is located at the bottom of a cliff. Johns Joke gets it's name from a local surfer who first surfed it 'as a bit of a joke': the irony is that this beach is now a recognised surfing beach listed in various Australian surfing guides. As with all major barrier beaches, the dunes can be quite extensive in places. Network members record heights to 50 metres and widths to 1000 metres and identified exotic and other non-native flora at 10 of the beach areas surveyed. Species identified include Marram grass, Senecio Elegans, Euphoria Terracina, and Ammophila Arenaria.

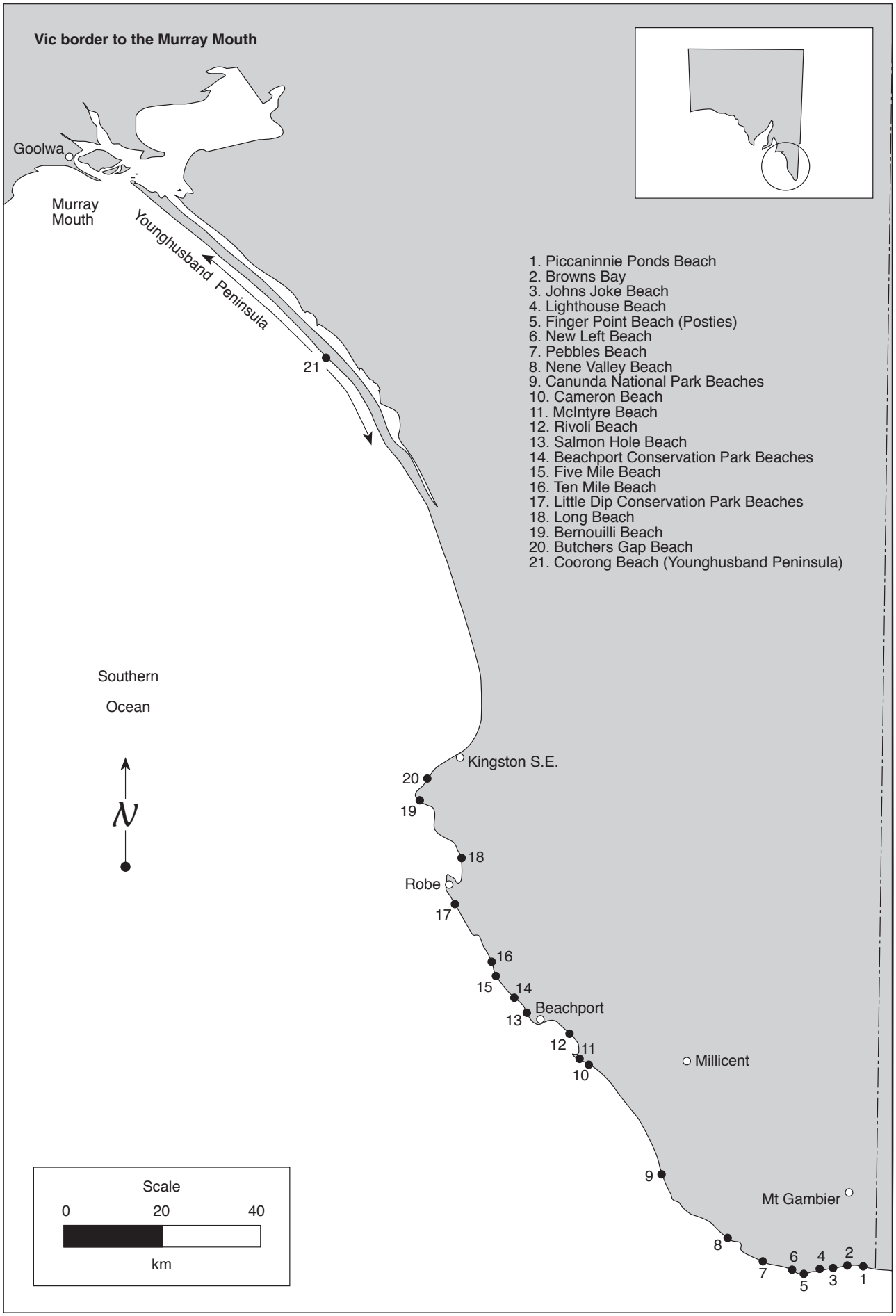
According to network members, only one of the beach areas surveyed falls within an urban area and there are no stormwater outlet pipes at beach areas surveyed.

Network members identified one sewerage outfall discharging in the vicinity of beach areas surveyed. This outfall is located at Finger Point (Port MacDonnell) and discharges approximately four million litres/day of secondary treated effluent into the ocean.

Public access to the beach areas surveyed is, in the main, unrestricted, although network members note one beach area where public access is hindered by private property.

Like many remote parts of the Australian coastline, litter and the impacts of off-road vehicles are the biggest problems affecting beaches in the region. Significantly, there were no development proposals said to be affecting beach areas surveyed.

•••• sparsely populated: low impacts


Vic border to the Murray Mouth
Goolwa
Murray Mouth
Younghusband Peninsula
21
1. Piccaninnie Ponds Beach
2. Browns Bay
3. Johns Joke Beach
4. Lighthouse Beach
5. Finger Point Beach (Posties)
6. New Left Beach
7. Pebbles Beach
8. Nene Valley Beach
9. Canunda National Park Beaches
10. Cameron Beach
11. McIntyre Beach
12. Rivoli Beach
13. Salmon Hole Beach
14. Beachport Conservation Park Beaches
15. Five Mile Beach
16. Ten Mile Beach
17. Little Dip Conservation Park Beaches
18. Long Beach
19. Bernouilli Beach
20. Butchers Gap Beach
21. Coorong Beach (Younghusband Peninsula)
Southern Ocean
N
Kingston S.E.
20
19
18
Robe
17
16
15
14
Beachport
13
12
11
10
Millicent
9
Mt Gambier
8
7
6
5
4
3
2
1
Scale
0
20
40
km

The Murray Mouth to Port Wakefield

Length of Coastline: 300 km (approximate estimate)

Number of Surveys: 43

Coverage: Good

The Murray Mouth to Port Wakefield is, with the exception of Adelaide and it's immediate environs, relatively sparsely populated. North of Port Adelaide the coastline is dominated by mangroves and mudflats: much of it inaccessible. South of Adelaide, the tip of the Fleurieu Peninsula is a predominately rocky coastline protected, in part, by the Deep Creek Conservation Park. Settlements on the south coast include Victor Harbor, Port Elliot and Goolwa.

Network members returned 43 surveys providing good coverage from Goolwa to Victor Harbour and Aldinga to Port Adelaide. Of the surveys, 40 are for individual beaches and three are section surveys. Lengths of beach areas surveyed range from 100 metres to 10 kilometres.

According to network members, 22 of the beach areas surveyed are without dunes. Many of these are Adelaide's beaches where dunal areas have long since been replaced by urban development.

According to network members, 24 of the beach areas surveyed are located in urban areas. Of these, there are 14 where development infringes to within 50 metres of the high tide mark. Network members identified stormwater outlet pipes at 23 of the beach areas surveyed, 15 of which had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter categories found were plastic bags and food wrappers.

Network members identified five public sewerage outfalls discharging in the vicinity of the beach areas surveyed. These are located at Victor Harbour, Christies Beach, Glenelg, Port Adelaide and Bolivar. The outfalls at Christies Beach, Glenelg, and Bolivar discharge to the ocean, whilst the Victor Harbour and Port Adelaide outfalls discharge to estuaries. Treatment standards are secondary or better and there is effluent re-use from three of the systems.

Network members identified six rivers and eight creeks as possible sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff, urban runoff, industrial effluent and sewage. By all reports, the most heavily compromised systems are the Murray, Inman and Patawalonga Rivers. In addition, Network Members indicate that Port Adelaide is heavily compromised by a variety of pollution sources including sewage, industrial effluent and leachate from rubbish-tips.

Public access to the beach areas surveyed is, in the main, unrestricted, although there are three beach areas where, according to network members, access is hindered by private property. Litter was evident at most of the beach areas surveyed. The most common litter categories found were plastic bags, food wrappers, cans and plastic bottles.

Network members identified development proposals affecting five of the beach areas surveyed, four involving housing developments.

Network members use additional comments to highlight a number of issues including: litter; pedestrian and vehicular impacts on dunal vegetation; the impacts of urban runoff on rivers, creeks and, subsequently, the marine environment including offshore reefs.

- 1/2 heavily populated in parts: moderate to high impacts in parts

Murray Mouth to Port Wakefield

1. Surfers Beach
2. Middleton Bay
3. Basham Beach
4. Crockery Bay
5. Horseshoe Bay
6. Green Bay
7. Knights Beach
8. Boomer Beach to Chiton Rocks
9. Haybrough Beach
10. Hindmarsh River to the Causeway
11. Yilki Beach
12. Petrel Cove
13. Waitpinga Beach
14. Parsons Beach
15. Tunkalilla Beach
16. Rapid Bay
17. Second Valley Beach
18. Yankalilla Bay
19. Normanville Beach
20. Carrickalinga Beach
21. Myponga Beach
22. Sellicks Beach
23. Aldinga Beach
24. Silver Sands Beach
25. Port Willunga Beach
26. Maslin Beach
27. Seaford Beach
28. Southport Beach
29. Port Noarlunga Beach
30. Christies Beach
31. O'Sullivans Beach
32. Kingston Park Beach
33. Seacliff Beach
34. Brighton Beach
35. Somerton Beach
36. Glenelg South Beach
37. Glenelg Beach
38. Glenelg North Beach
39. West Beach
40. Henley South Beach
41. Henley Beach
42. Grange Beach
43. Hindmarsh Beach to Woodville Beach

Kangaroo Island

1. Emu Bay
2. Boxing Bay
3. Bay of Shoals
4. The Bluff
5. Ozone Beach
6. Brownlow Beach
7. Nepean Bay
8. Min-oil Beach
9. Redbanks Beach
10. Island Beach
11. American Beach
12. Christmas Cove
13. Hog Bay
14. Antechamber Bay
15. Pink Bay
16. Black Point Beach
17. Neaves Beach
18. D'Estrees Bay
19. Bales Bay
20. Seal Bay
21. Vivonne Bay
22. Hanson Bay
23. Knife and Steel Beach
24. Maupertuis Beach
25. Rocky Rivermouth Beach
26. Sandy Beach
27. Breakneck Rivermouth Beach
28. West Bay
29. Ravine des Casoars Beach
30. Western River Beach
31. Snellings Beach
32. King George Beach
33. Stokes Bay

Kangaroo Island

Length of Coastline: 300 km (approximate estimate)

Number of Surveys: 33

Coverage: Very good

Kangaroo Island is located 15 kilometres due east from the tip of the Fleurieu Peninsula, approximately 140 kilometres south of Adelaide. It is Australia's third largest island (Tasmania and Melville are bigger) and has a resident population of approximately 4000, most of whom live in settlements along the east coast, namely Kingscote, Emu Bay, American River, Penneshaw, Saphiretown, and Cygnet River. Other settlements include Parndana, Vivonne Bay and Karatta. The coastline is predominately rocky and comprise of rugged cliffs whilst the island itself is relatively flat and rich in flora and fauna including penguins, sea lions, kangaroos, emus, goannas, platypus and also koalas which were introduced to the island in the early 1950s. To complement and protect the rich diversity of flora and fauna, the island has some 17 conservation parks (including two of it's islets) and the Flinders Chase National Park.

Network members returned 33 surveys providing good coverage of the island. All of the surveys are for individual beaches and beach lengths range from 100 metres to 25 kilometres.

According to network members, seven of the beach areas surveyed do not retain dunes. Where dunes exist they are generally moderate in size. Network members note heights to 30 metres and widths to 300 metres in places. Network members identified only one exotic flora, the African Boxthorn, which was found at three of the beach areas surveyed.

According to network members, five of the beach areas surveyed are located in urban areas and a further 14 have property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at four of the beach areas surveyed, none of which had litter evident at the time of survey.

There are no public sewerage outfalls on the island. Residential areas are serviced by septic tanks and the like.

Network members identified eight rivers and one creek as sources of beach pollution via their respective catchments. Pollution sources include, predominately, agricultural runoff.

Public access to beach areas surveyed is, in the main, unrestricted, although network members note three beach areas where access is closed due to private property.

Network members identified development proposals affecting eight of the beach areas surveyed including three involving housing development and one involving a marina/canal development.

According to network members, litter is the biggest problem affecting beaches on the island.

•••• sparsely populated: low impacts


Project Wet
Seifriden Foundation

Port Wakefield to Point Bolingbroke

Length of Coastline: 980 km (approximate estimate)

Number of Surveys: 73

Coverage: Reasonable

Port Wakefield to Point Bolingbroke is a sparsely populated coastline that takes in the industrial towns of Port Pirie, Port Augusta and Whyalla. The tip of the Yorke Peninsula is a rocky coast comprising sheer limestone cliffs and rugged headlands and protected by the Innes national park. The upper sections of the Spencer and St Vincent gulfs are dominated by mud flats and mangroves. The middle and lower sections of the east coast of the Eyre Peninsula are dominated by mainland beaches and the southern section by rocky coastline. Other conservation reserves include the Clinton, Munyaroo and Franklin Harbor conservation parks.

Network members returned 73 surveys providing reasonable coverage of the southern section of the Yorke Peninsula and along the east coast of the Eyre Peninsula between Cowell and Tumby Bay. Of the surveys, 67 are for individual beaches, three are for groups of two or more beaches and three are section surveys covering beach areas between two geographical points. Lengths of beach areas surveyed range from 200 metres to 20 kilometres.

Nearly half of the beach areas surveyed are without dunes: the majority because they are located at the base of cliffs or amongst rocky outcrops. Where dunes exist they can be quite extensive in size. Dune sizes recorded by network members range in heights from one to 20 metres, and widths from five to 2000 metres. Network members identified exotic and other non-native flora at 14 of the beach areas surveyed. Species identified include Boxthorn, Onion weed, Bridal creeper, and Kikuyu grass.

According to network members, 18 of the beach areas surveyed are located in urban areas. A further 30 have road access to within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at five of the beach areas surveyed, two of which had litter evident in the vicinity of pipe discharge at the time of survey.

Network members identified three sewerage outfalls discharging in the vicinity of the beach areas surveyed. These outfalls are located at Port Pirie, Port Augusta and Tumby Bay and discharge primary treated effluent into the ocean.

Network members identified three rivers and nine creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff, sewage effluent, industrial effluent and septic leachate.

Public access to the beach areas surveyed is, in the main, unrestricted although network members note 11 beach areas where access is hindered by private property.

Network members identified development proposals affecting 12 of the beach areas surveyed including three involving housing development. Other proposals include a plan to dredge the Port Pirie River which, according to network members, has the potential to re-suspend heavy metals discharged from the Port Pirie lead and zinc smelter. Also proposed for Port Pirie is a rare earth plant which will produce radioactive waste as a by-product. According to network members locals are concerned that the site picked for this proposal is unsuitable because it experiences tidal surges.

Network members use additional comments to highlight a number of issues including: the destruction of dunal vegetation by wayward pedestrian traffic and four wheel drives (for example at Telowie Beach); the leaching of contaminants from a public landfill at Port Germein; the impacts of various industries on the upper Spencer Gulf; and the impacts, including septic seepage and litter, associated with beach front shacks at Blanche Harbour.

••• sparsely populated: generally low impacts; moderate in places


Port Wakefield to Point Bolingbroke
1. Stansbury Beach
2. Wool Bay Beach
3. Coobowie Beach
4. Edithburgh Beach
5. Goldsmiths Beach
6. Kemp Bay
7. Port Moorowie
8. Mozzie Flats Beach
9. Sturt Bay
10. Sandy Point
11. Point Davenport
12. Hillcocks Drive
13. Marion Bay
14. Jollys Beach
15. Stenhouse Bay
16. Little Chinamens Beach
17. Chinamans Hat Beach
18. Chinamens Reef Beach
19. Cable Bay
20. Cape Spencer
21. Howling Cave Beach
22. Ethel Beach
23. West Cape Beach
24. West Bay
25. Pondalowie Bay
26. Dolphin Beach
27. Shell Beach
28. Browns Beach
29. Gym Beach
30. Little Lizard Bay
31. Gleesons Landing
32. Berry Bay
33. Corny Point Beach
34. Pines and Couchs Beach
35. Levens Beach
36. Burners Beach
37. Point Turton Beach
38. Hardwicke Bay
39. Rifle Butts Beach
40. Balgowan Beach
41. The Gap Beach
42. Port Hughes Beach
43. Moonta Bay Beach
44. Solomontown Beach
45. Tewolie Beach
46. Port Germein
47. Upper Spencer Gulf
48. Port Augusta Beach / tidal areas
49. Lucky Bay
50. Victoria Point
51. Cowell tidal pool
52. Port Gibbon Beach
53. Mills Beach
54. Poverty Bay
55. Red Banks Beach
56. Turnbulls Beach
57. Arno Beach
58. Drivers Beach
59. Sims Beach
60. Sims to Mikamien Beach
61. Mikamien Beach
62. Mikamien to Coxs Beach
63. Coxs Beach
64. Dutton Bay
65. Kinnaird Beach
66. Byrne Bay
67. Mottled Cove (Point Neill)
68. Jollys Beach
69. Schunkes Beach (Carrow Wells)
70. Tumby Bay
71. Ski Beach
72. Trinity Haven to Red Cliff Beach
73. Thuruna Beach
Port Augusta
48
47
Whyalla
45,46
44
Port Pirie
Port Broughton
Cowell
51
50
49
53
52
55
54
56
57
Cape Driver
58-63
65
64
66,67
68,69
Wallaroo
42,43
Moonta
Port Wakefield
41
40
Tumby Bay
70,71
Spencer Gulf
72
73
Point Bolingbroke
Port Victoria
39
Ardrossan
Gulf St Vincent
Yorke Peninsula
Port Vincent
Corny Point
33
35,36
32
34
38
37
Warooka
1
2
31
Yorketown
3
30
Edithburgh
4
10,11
9
7,8
6
5
29
24-28
13
12
West Cape
14-23
Scale
0
25
50
km
N

Point Bolingbroke to WA border

Length of Coastline: 1360km (approximate estimate)

Number of Surveys: 47

Coverage: Reasonable

Point Bolingbroke to the Western Australia border takes in the tip of the Eyre Peninsula and eastern half of the Great Australian Bight. It is a remote and sparsely populated coastline comprised of rocky coasts and mainland beaches. Port Lincoln is the largest settlement on the coast with a harbour three times the size of Sydney and is home to Australia's largest tuna-fishing fleet. On the tip of the Eyre Peninsula the Lincoln and Coffin Bay national parks protect approximately 46 000 hectares of coastal habitat. West from Coffin Bay there are a number of small coastal settlements including Elliston, Venus Bay and Streaky Bay.

Network members returned 47 surveys providing reasonable coverage of the region. Of the surveys, 41 are for individual beach areas, three are group surveys covering two or more beaches, and four are section surveys covering beach areas between two geographical points. Lengths of beach areas surveyed range from 200 metres at Gallipoli Beach to the 50 kilometre Anxious Bay.

According to network members, 23 of the beach areas surveyed are without dunal systems. Where dunes exist they can be quite extensive, and the region has some of the largest sand dunes in Australia. Dune sizes recorded by network members range in heights from two to 100 metres, and widths from 20 to 4000 metres. Network members identified exotic and other non-native flora at 22 of the beach areas surveyed. Species identified include Cackile Maritima, Euphorbia, African Daisy, Boxthorn and Bridal creeper.

According to network members, three of the beach areas surveyed are located in urban areas. A further five have housing to within 250 metres of the high tide mark and 19 have road access to within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at only two of the beach areas surveyed, one of which had litter evident in the vicinity of pipe discharge.

Network members identified three sewage outfalls discharging in the vicinity of the beach areas surveyed. These are located at Port Lincoln, Bairds Bay and Streaky Bay. The Port Lincoln outfalls discharges secondary treated effluent into the ocean. There are no details for the outfalls at Bairds Bay or Streaky Bay.

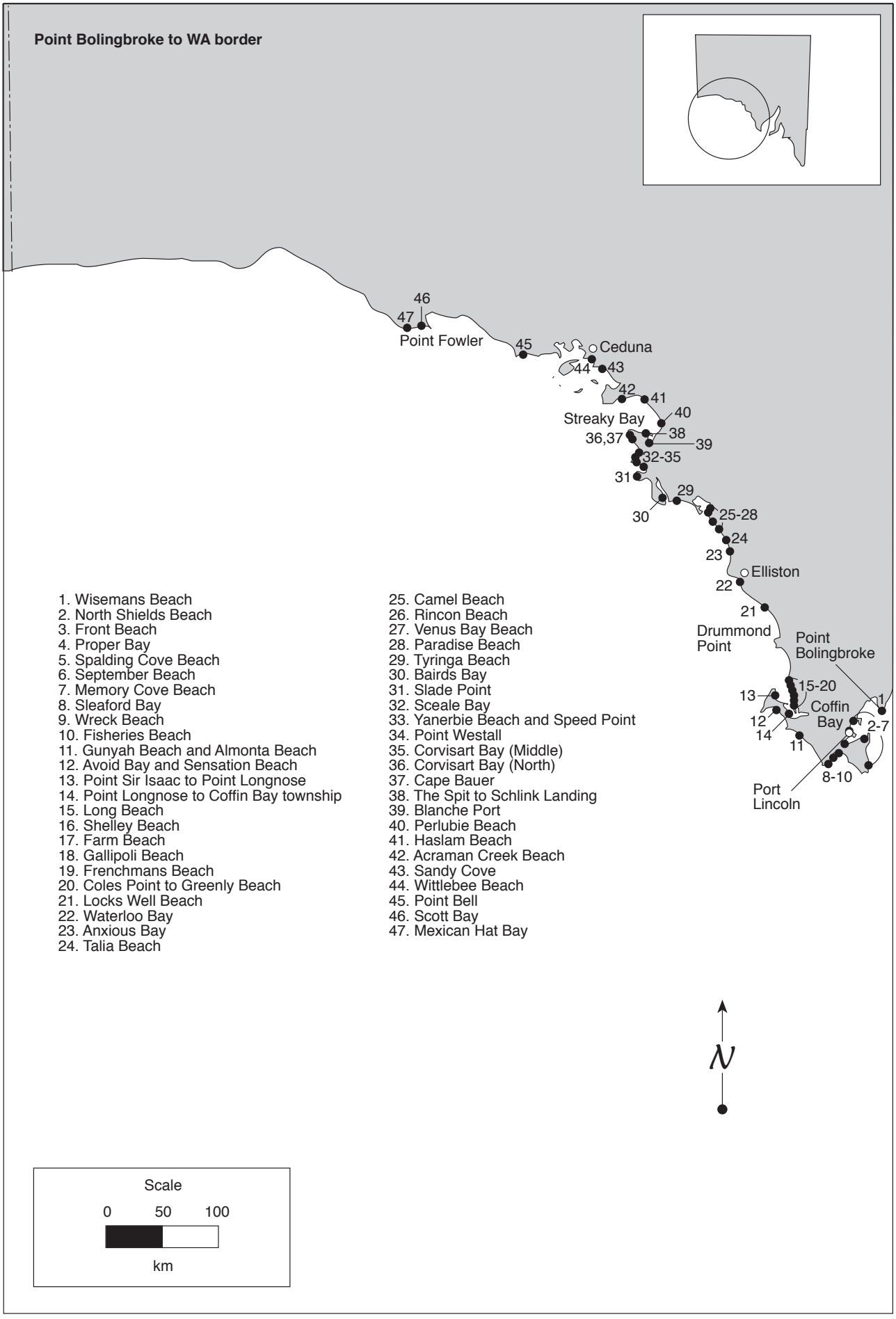
The Eyre Peninsula is essentially a porous limestone landmass and surface water quickly disperses underground. As such, there are no free-flowing rivers or creeks. Network members note, however, erosion gullies draining silt into mangrove habitats at Schlink Landing. Erosion and agricultural runoff are also impacting on beach areas at Blanche Port and Perlubie Beach.

Public access to beach areas surveyed is, in the main, unrestricted, although network members note two beach areas where access is hindered by private property.

Network members identified development proposals affecting six of the beach areas surveyed, including three involving housing developments. Other proposals include an aquaculture development at Venus Bay Beach which, according to network members, is strongly opposed by many in the local community. Another controversial development is a marina/canal estate development planned for Perlubie Beach.

Network members use additional comments to highlight a number of issues including the need to protect the region from inappropriate housing and commercial development. Other issues include litter pollution and the impacts of wayward pedestrian traffic and four wheel drives on dunal systems.

•••• sparsely populated: low impacts


Point Bolingbroke to WA border
46
47
Point Fowler
45
Ceduna
44
43
42
41
40
Streaky Bay
36,37
38
39
32-35
31
29
30
25-28
24
23
Elliston
22
21
Drummond Point
Point Bolingbroke
15-20
13
1
Coffin Bay
12
14
11
2-7
8-10
Port Lincoln
1. Wisemans Beach
2. North Shields Beach
3. Front Beach
4. Proper Bay
5. Spalding Cove Beach
6. September Beach
7. Memory Cove Beach
8. Sleaford Bay
9. Wreck Beach
10. Fisheries Beach
11. Gunyah Beach and Almonta Beach
12. Avoid Bay and Sensation Beach
13. Point Sir Isaac to Point Longnose
14. Point Longnose to Coffin Bay township
15. Long Beach
16. Shelley Beach
17. Farm Beach
18. Gallipoli Beach
19. Frenchmans Beach
20. Coles Point to Greenly Beach
21. Locks Well Beach
22. Waterloo Bay
23. Anxious Bay
24. Talia Beach
25. Camel Beach
26. Rincon Beach
27. Venus Bay Beach
28. Paradise Beach
29. Tyringa Beach
30. Bairds Bay
31. Slade Point
32. Sceale Bay
33. Yanerbie Beach and Speed Point
34. Point Westall
35. Corvisart Bay (Middle)
36. Corvisart Bay (North)
37. Cape Bauer
38. The Spit to Schlink Landing
39. Blanche Port
40. Perlubie Beach
41. Haslam Beach
42. Acraman Creek Beach
43. Sandy Cove
44. Wittlebee Beach
45. Point Bell
46. Scott Bay
47. Mexican Hat Bay
N
Scale
0 50 100
km

3.6 Western Australia

Western Australia has a coastline, including major islands, of approximately 12000 kilometres[14]. Along the mainland coast there are some 1500 beaches[4]. The survey targeted all areas of the mainland coast and Rottnest Island.

Network members returned 346 surveys providing data on 303 mainland beach areas and 43 island beach areas. Of the surveys, 304 are for individual beaches, 22 are for groups of two or more beaches, and 20 are for beach areas between two geographic points.

According to network members, 72 (21 per cent) of the beach areas surveyed are without dunes including eight that have lost their dunal system to urban development. Network members identified exotic and other non-native flora at 70 (20 per cent) of the beach areas surveyed. Species identified are mainly common knowledge species like Boxthorn, Onion weed, Kapok bush, Buffel grass and Marram grass. Other species identified include Norfolk Island Pines, Japanese Pepper trees, Oenothera Drummondii, Septosperuum, Trachyandra Divaricata, Cahile Maritima and Aerva Javania.

According to network members, 65 (19 per cent) of the beach areas surveyed are located in urban areas and 203 (80 per cent) have property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at 43 (12 per cent) of the beach areas surveyed, 11 of which had litter evident in the vicinity of pipe discharge at the time of survey. The four most common litter categories evident were food wrappers and cigarette butts (64 per cent), plastic bags (55 per cent) and PET/plastic bottles (36 per cent).

Network members identified four public sewerage outfalls discharging in the vicinity of beach areas surveyed. Of these, three are located in the Perth Metropolitan area and one at Bunbury. Elsewhere in Western Australia, sewage is handled via septic or stabilisation ponds and effluent re-use is common, particularly in the north west. All four outfalls identified discharge to the ocean: three discharge secondary treated effluent and one discharges primary treated effluent. There is no effluent re-use occurring from these systems and the outfalls have a combined discharge of approximately 272 million litres per day.

Network members listed 36 water courses, including 19 rivers and 11 creeks, as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff (71 per cent), litter and debris (21 per cent).

There was litter evident at approximately 75 per cent of the beach areas surveyed. The four most common litter categories evident were cans (75 per cent), cigarette butts (65 per cent), food wrappers (58 per cent) and plastic bags (61 per cent).

Network members identified mining operations at 13 of the beach areas surveyed including four shorebase leases for oil and gas operations, three dredging operations, two sandmines and two quarries.

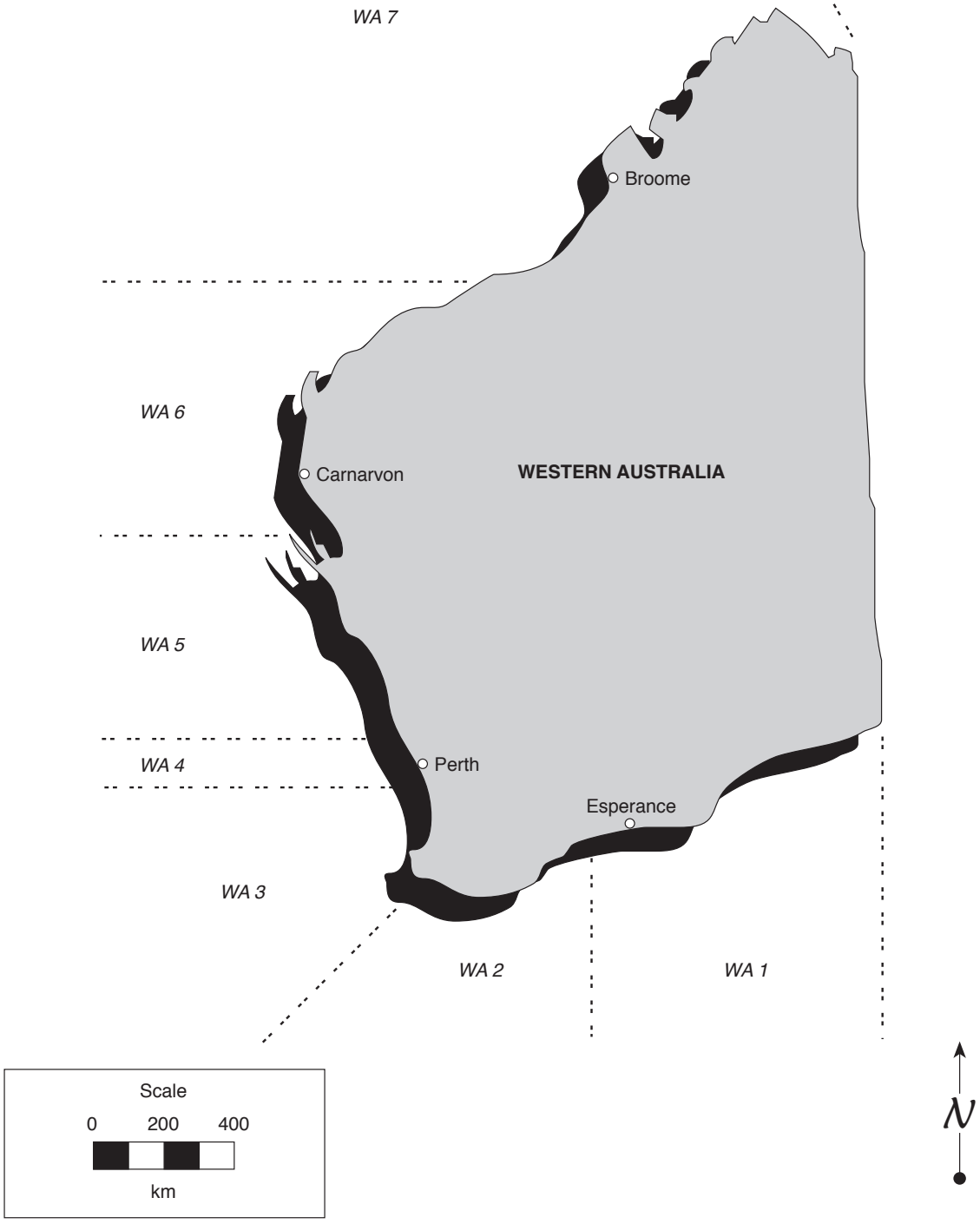
Network members identified development proposals affecting 76 (22 per cent) of the beach areas surveyed including 29 involving housing development, 14 involving resort development and 11 involving marina and/or canal development.

Public access to beach areas surveyed is, in the main, unrestricted, although network members note 24 beach areas where access is hindered by private property. A further 11 beach areas are closed to the public, eight because of mining leases, two for conservation reasons and one because of farming property.

Network members use additional comments to highlight a number of issues and these are covered in the regional summaries.

Western Australia coastal regions

WA 1. SA border to Hopetoun
WA 2. Hopetoun to Cape Leeuwin
WA 3. Cape Leeuwin to Mandurah
WA 4. Mandurah to Two Rocks
WA 5. Two Rocks to Steep Point
WA 6. Steep Point to Point Keraurdren
WA 7. Point Keraurdren to NT border



SA border to Hopetoun

Length of Coastline: 1060km (approximate estimate)

Number of Surveys: 45

Coverage: Reasonable

The South Australian border to Hopetoun is a sparsely populated coastline that takes in the settlements of Esperance and Hopetoun. Approximately three-quarters of the coastline is held in conservation tenure, the most notable of which are the Cape Arid, Cape Le Grand and Stokes national parks and the Nuytsland nature reserve.

Network members returned 45 surveys providing reasonable coverage given the remote nature of much of this coastline. All of the surveys are for individual beaches and lengths range from 200 metres to 25 kilometres.

According to network members, 11 of the beach areas surveyed are without dunes including one beach area that has lost its dunal system to urban development. Where dunes exist they are generally moderate in size averaging five to 40 metres in height and 10 to 100 metres in width, although Dunns Beach and Le Grand Beach have dunes that extend up to 1500 metres inland. Network members identified exotic and other non-native flora at two of the beach areas surveyed. Species identified include Boxthorn and Marram grass.

According to network members, six of the beach areas surveyed are located in urban areas and a further 15 have property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at three of the beach areas surveyed, none of which had litter evident in the vicinity of pipe discharge at the time of survey.

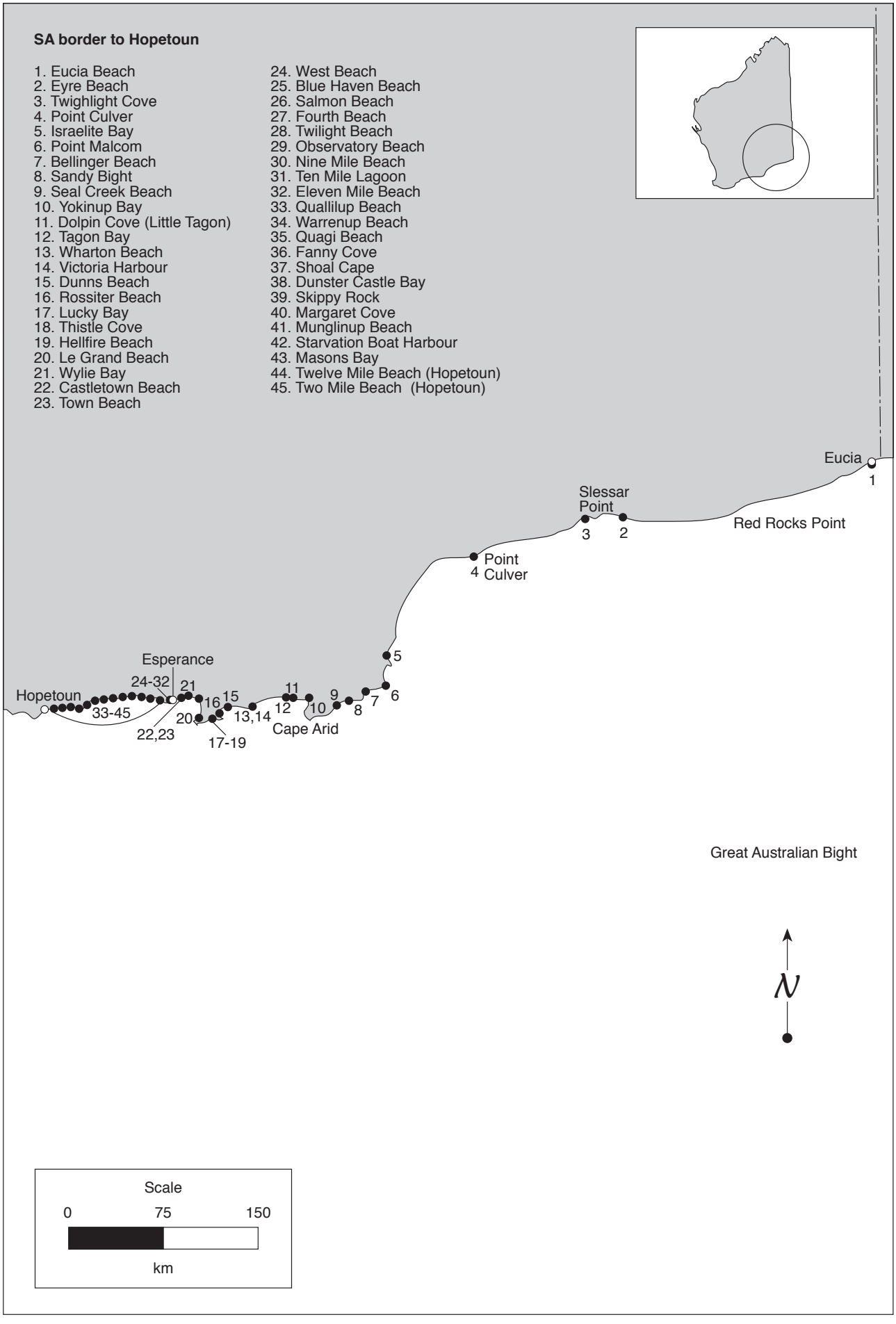
According to network members there are no public sewerage outfalls discharging in the vicinity of beach areas surveyed. All sewage is treated via septics or stabilisation ponds.

Network members identified two rivers and one creek as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff and litter/debris.

Public access to the beach areas surveyed is, in the main, unrestricted, although network members note one beach area where access is hindered by beach front property. In addition, another beach is closed because of dieback disease and the track condition.

Network members use additional comments to highlight a number of issues including: the impacts of pedestrian traffic and four wheel drives on dunal areas and ground-nesting bird species; the impacts of introduced flora and fauna including horses; and litter. Significantly, network members did not identify any development proposals affecting beach areas surveyed.

•••• sparsely populated: low impacts


SA border to Hopetoun
1. Eucia Beach
2. Eyre Beach
3. Twighlight Cove
4. Point Culver
5. Israelite Bay
6. Point Malcom
7. Bellinger Beach
8. Sandy Bight
9. Seal Creek Beach
10. Yokinup Bay
11. Dolpin Cove (Little Tagon)
12. Tagon Bay
13. Wharton Beach
14. Victoria Harbour
15. Dunns Beach
16. Rossiter Beach
17. Lucky Bay
18. Thistle Cove
19. Hellfire Beach
20. Le Grand Beach
21. Wylie Bay
22. Castletown Beach
23. Town Beach
24. West Beach
25. Blue Haven Beach
26. Salmon Beach
27. Fourth Beach
28. Twilight Beach
29. Observatory Beach
30. Nine Mile Beach
31. Ten Mile Lagoon
32. Eleven Mile Beach
33. Quallilup Beach
34. Warrenup Beach
35. Quagi Beach
36. Fanny Cove
37. Shoal Cape
38. Dunster Castle Bay
39. Skippy Rock
40. Margaret Cove
41. Munglinup Beach
42. Starvation Boat Harbour
43. Masons Bay
44. Twelve Mile Beach (Hopetoun)
45. Two Mile Beach (Hopetoun)
Eucia
1
Slessar Point
3
2
Red Rocks Point
Point Culver
4
5
6
7
8
9
10
11
12
13,14
15
16
17-19
20
21
22,23
24-32
33-45
Esperance
Hopetoun
Cape Arid
Great Australian Bight
N
Scale
0
75
150
km

Hopetoun to Cape Leeuwin

Length of Coastline: 730km (approximate estimate)

Number of Surveys: 50

Coverage: Reasonable

Hopetoun to Cape Leeuwin is a sparsely populated coastline with the exception of the 150 kilometre stretch between Albany and Walpole. Albany is the largest settlement on the coast with a population of approximately 16 000. Other coastal settlements include Bremer Bay, Denmark and Nornalup. Conservation reserves include the Fitzgerald River, Waychinicup, Torndirrup, West Cape Howe, William Bay, Walpole, Nornalup and D'Entrecasteaux national parks. Cape Leeuwin marks the point at which the Indian and Southern Oceans meet.

Network members returned 50 surveys: 48 for individual beaches and two group surveys. Lengths of beach areas surveyed range from 100 metres to seven kilometres.

According to network members,10 of the beach areas surveyed are without dunes. Where dune exists they can be quite extensive ranging in size from heights of two to 100 metres and widths of two to 2000 metres. Network members identified exotic and other non-native flora at only two of the beach areas surveyed. Species identified include Geraniums.

According to network members, three of the beach areas surveyed are located in urban areas and a further 24 have property and/or infrastructure development within 250 metres of the high tide mark.

Network members identified stormwater outlet pipes at one of the beach areas surveyed, although there was no litter evident in the vicinity of pipe discharge at the time of survey.

According to network members there are no public sewerage outfalls discharging in the vicinity of beach areas surveyed, although the Albany regional prison has an outfall located at Sandpatch Beach.

Network members identified eight rivers as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff, urban runoff and litter/debris.

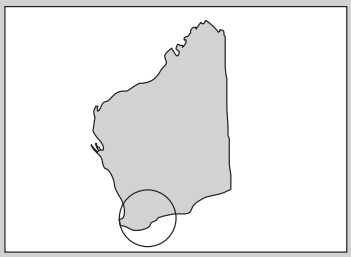
Network members identified development proposals affecting 11 of the beach areas surveyed, three involving housing development and seven involving infrastructure development including road upgrades.

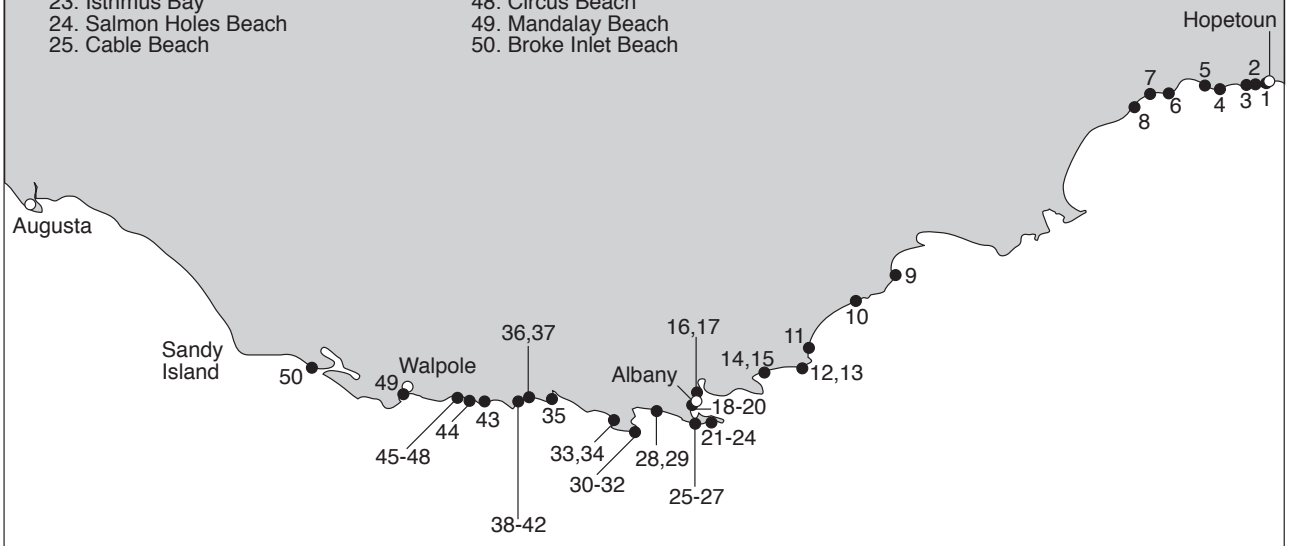
Network members use additional comments to highlight a number of issues including the impacts of pedestrian traffic and four wheel drives on dunal areas; the impacts of introduced flora and fauna; and litter.

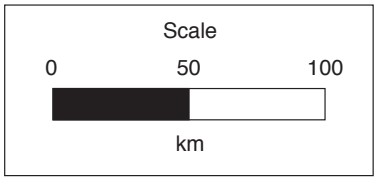
•••• sparsely populated: low impacts

Hopetoun to Leeuwin

1. West Beach (Hopetoun)
2. Four Mile Beach
3. Barrens Beach
4. East Mylies and Mylies Beach
5. West Beach (Fitzgerald River NP)
6. Hammersley Beach
7. Whale Bone Beach
8. Quoin Head
9. Cape Riche
10. Warriup Beach
11. Cheynes Beach
12. Back Beach
13. Waychinicup NP Beaches
14. Two Peoples Bay
15. Little Beach
16. Nanarup Beach
17. Gull Rock Beach
18. Emu Beach
19. Emu Point
20. Middleton Beach
21. Frenchman Bay
22. Misery Beach
23. Isthmus Bay
24. Salmon Holes Beach
25. Cable Beach
26. Sharp Beach
27. Sandpatch Beach
28. Mutton Bird Beach
29. Perkins Beach
30. Dingo Beach
31. Shelley Beach
32. Dunsky Beach
33. Golden Gates Beach
34. Bornholm Beach
35. Ocean Beach
36. Lights Beach
37. Madfish Bay Beach
38. Waterfall Beach
39. Elephant Rocks Beach
40. Green Pools Beach
41. William Bay
42. Parry Beach
43. Peaceful Bay
44. Conspicuous Beach
45. Bellenger Beach
46. Blue Holes Beach
47. Shelley Beach
48. Circus Beach
49. Mandalay Beach
50. Broke Inlet Beach







Cape Leeuwin to Becher Point

Length of Coastline: 480km (approximate estimate)

Number of Surveys: 54

Coverage: Reasonable

Cape Leeuwin to Becher Point takes in the 100 kilometre rocky coast between Cape Leeuwin and Cape Naturaliste and the major barrier beaches between Dunsborough and Becher Point. Cape to Cape is an area noted for its beautiful beaches, world-class surfing breaks and wineries. The whole area is becoming increasingly popular with tourists and population is on the increase. Not surprisingly, many locals are keen to avoid the haphazard and unchecked development that has occurred along much of the eastern seaboard. As such, they are generally quick to scrutinize any new development proposals and rightly so. Fortunately, much of the coastline is held in conservation tenure including the Scott, Leeuwin-Naturaliste and Yalgorup national parks.

Network members returned 54 surveys: 43 for individual beaches, ten section surveys and one group survey. Lengths of beach areas surveyed range from 150 metres to 15 kilometres.

According to network members, 10 of the beach areas surveyed are without dunes including Dunsborough Beach that has lost its dunal system to urban development. Network members identified exotic and other non-native flora at three of the beach areas surveyed including Oenothera Drummondii and Cahile Maritima.

According to network members, 10 of the beach areas surveyed are located in urban areas and 21 have road access to within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at four beaches, none of which had litter evident in the vicinity of pipe discharge at the time of survey.

The only public sewerage outfall discharging in the vicinity of beach areas surveyed is located at Bunbury and discharges secondary treated effluent to the ocean from the Bunbury No 1 Plant. This outfall will close down in 1996 and the town's sewage treated at an upgraded wastewater treatment plant south of Glen Padden.

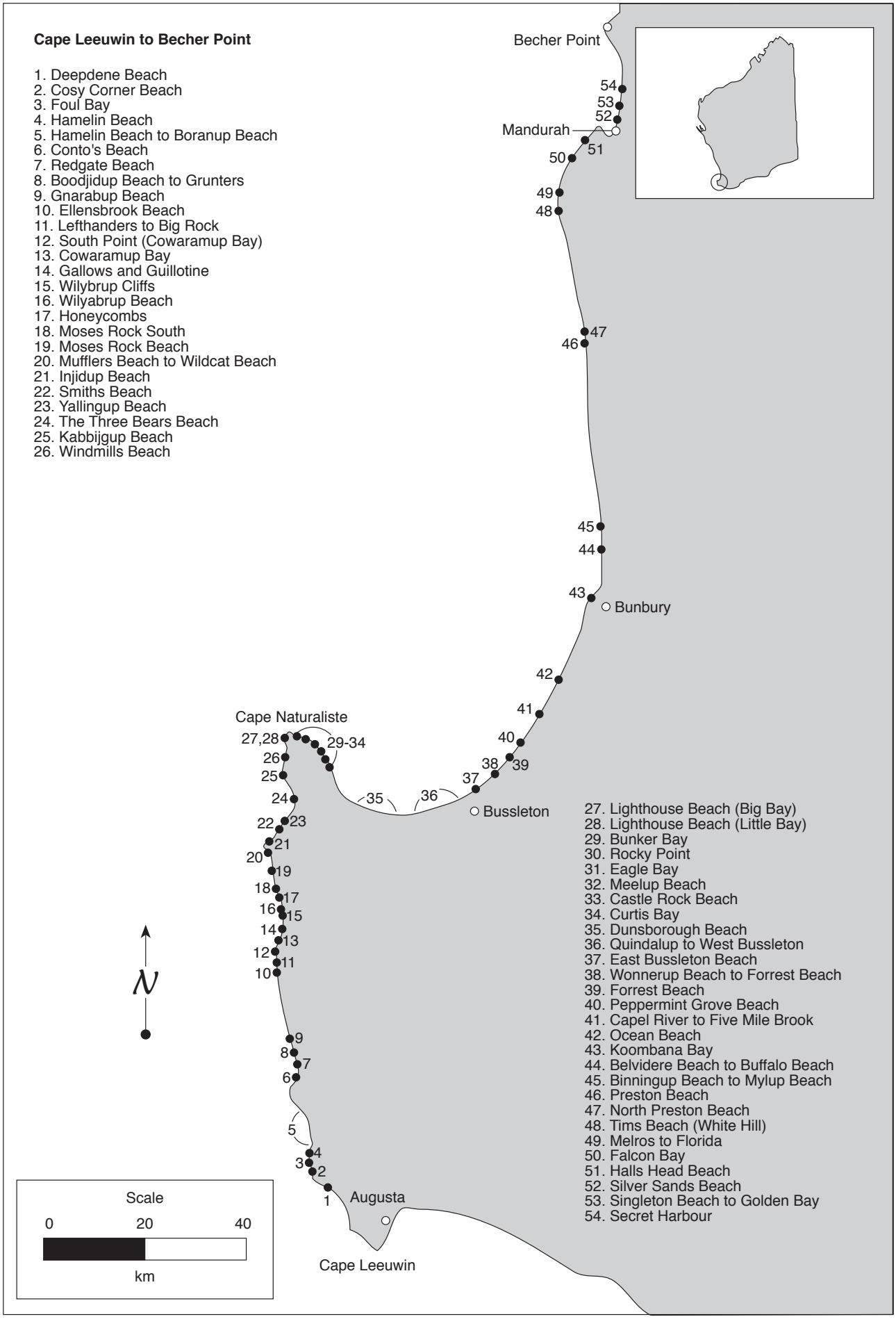
Network members identified three rivers and six creeks as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff and litter.

According to network members, public access to beach areas surveyed is, in the main, unrestricted, although network members note one beach area where access is hindered by private property.

Network members identified development proposals affecting 14 of the beach areas surveyed including seven involving housing development, four involving resort development, two involving marina development, and two involving golf course development. Network members note that a proposal for residential and commercial development at Gnarabup Beach was given the go-ahead by state government in spite of a local majority opposed to the development.

Network members use additional comments to highlight a number of issues including: the impacts of four wheel drives on dunal areas; inappropriate residential and commercial development proposals; litter and, in particular, fishing related debris like plastic bait packets and beer cans.

••• 1/2 sparsely populated: moderate impacts in places


Cape Leeuwin to Becher Point
1. Deepdene Beach
2. Cosy Corner Beach
3. Foul Bay
4. Hamelin Beach
5. Hamelin Beach to Boranup Beach
6. Conto's Beach
7. Redgate Beach
8. Boodjidup Beach to Grunters
9. Gnarabup Beach
10. Ellensbrook Beach
11. Lefthanders to Big Rock
12. South Point (Cowaramup Bay)
13. Cowaramup Bay
14. Gallows and Guillotine
15. Wilybrup Cliffs
16. Wilyabrup Beach
17. Honeycombs
18. Moses Rock South
19. Moses Rock Beach
20. Mufflers Beach to Wildcat Beach
21. Injidup Beach
22. Smiths Beach
23. Yallingup Beach
24. The Three Bears Beach
25. Kabbijgup Beach
26. Windmills Beach
Becher Point
Mandurah
Bunbury
Cape Naturaliste
Bussleton
Augusta
Cape Leeuwin
27. Lighthouse Beach (Big Bay)
28. Lighthouse Beach (Little Bay)
29. Bunker Bay
30. Rocky Point
31. Eagle Bay
32. Meelup Beach
33. Castle Rock Beach
34. Curtis Bay
35. Dunsborough Beach
36. Quindalup to West Bussleton
37. East Bussleton Beach
38. Wonnerup Beach to Forrest Beach
39. Forrest Beach
40. Peppermint Grove Beach
41. Capel River to Five Mile Brook
42. Ocean Beach
43. Koombana Bay
44. Belvidere Beach to Buffalo Beach
45. Binningup Beach to Mylup Beach
46. Preston Beach
47. North Preston Beach
48. Tims Beach (White Hill)
49. Melros to Florida
50. Falcon Bay
51. Halls Head Beach
52. Silver Sands Beach
53. Singleton Beach to Golden Bay
54. Secret Harbour
N
Scale
0 20 40
km

Becher Point to Two Rocks Beach

Length of Coastline: 125km (approximate esimtate)

Number of Surveys: 35

Coverage: Very good

Becher Point to Two Rocks Beach takes in the city of Perth and numerous other coastal settlements. It is the most heavily populated region in Western Australia. To the south lies the city of Rockingham which encompasses the promontory between Warnbro Sound and Cockburn Sound. Adjacent to this promontory are the islands of the Shoalwater Islands Marine Park. Deep water berths on the eastern shores of Cockburn Sound have attracted the intensive heavy industrial area of Kwinana. Waste water discharged from this area, combined with tributyltin from anti-fouling paints, impacts heavily on the marine environment of Cockburn Sound. These impacts have been compounded by the Garden Island Causeway which has reduced the natural flushing capabilities of the Sound. The City of Perth encompasses approximately 30 kilometres of coastline in an almost continuous stretch of urban development from Fremantle to Burns Beach. Between Burns Beach and Two Rocks there are another two small coastal settlements: Quinns Rocks and Yanchep.

Network members returned 35 surveys: 25 are for individual beaches, two are group surveys including one for Penguin Island, and eight are section surveys. Lengths of beach areas surveyed range from 300 metres to nine kilometres.

According to network members, all of the beach areas surveyed have dunal systems although dunal areas at Cockburn Sound and Owen Anchorage have been heavily compromised by industrial development. Dune sizes range from one to 25 metres in height and10 to 1000 metres in width. Network members identified exotic and other non-native flora at 30 of the beach areas surveyed. Species identified include Marram grass, Geraniums and Norfolk Island Pines.

According to network members, 24 of the beach areas surveyed are located in urban areas including 15 where development infringes to within 100 metres of the high tide mark. Network members identified stormwater outlet pipes at 20 of the beach areas surveyed, seven of which had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter categories evident were cigarette butts and plastic bags.

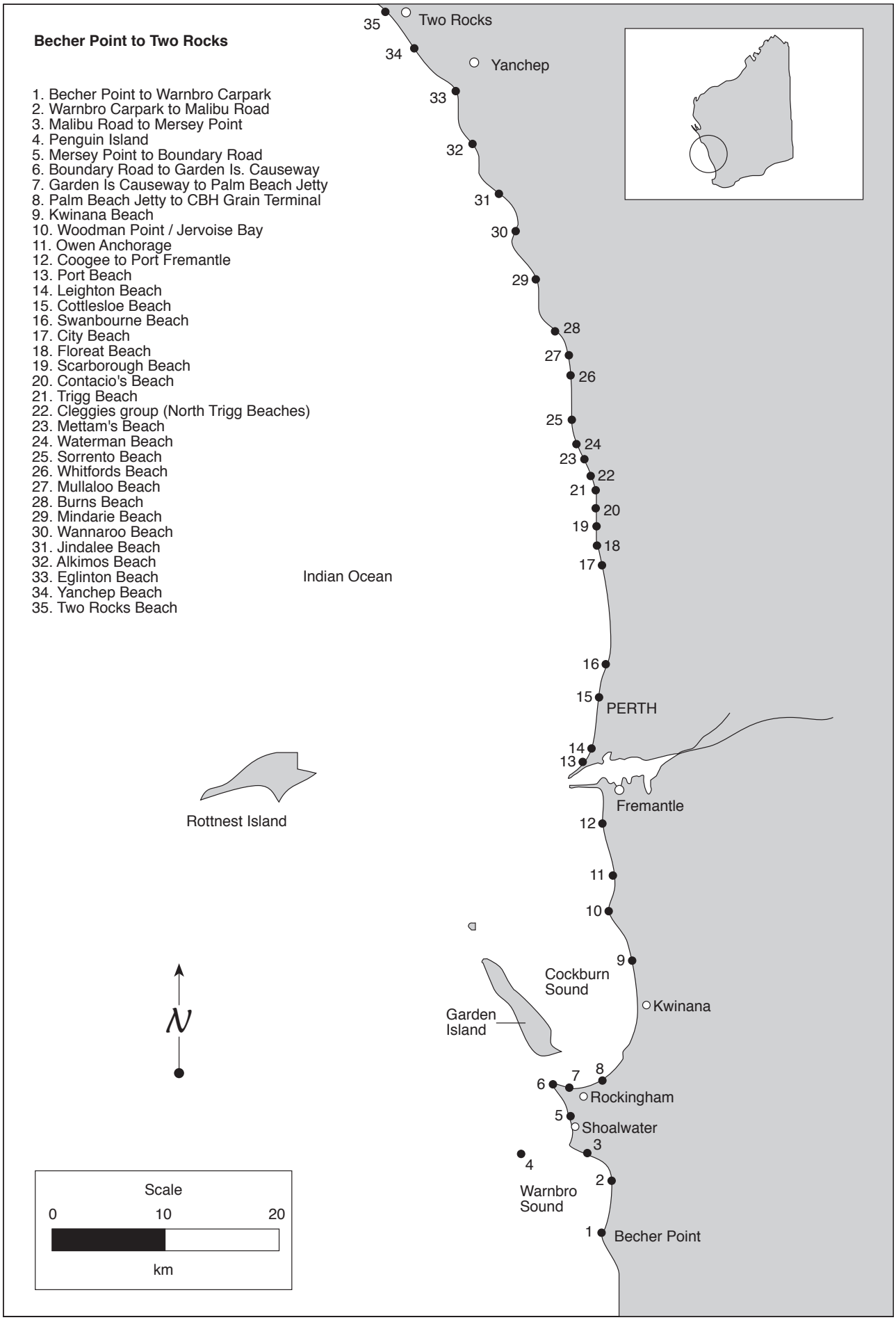
There are three sewerage outfalls discharging to the ocean in the vicinity of beach areas surveyed. These are located at Cape Peron, Swanbourne Beach and Ocean Reef (Beenyup). All three outfalls discharge through extended pipes to offshore waters: the Swanbourne Beach and Ocean Reef outfalls discharge secondary treated effluent whilst the Point Peron outfall discharges primary treated effluent. The outfalls have a combined discharge of approximately 270 million litres per day.

Public access to the beach areas surveyed is, in the main, unrestricted, although network members note six beach areas where access is hindered by private property. In addition, access to the north end of Swanbourne Beach is restricted because of a firing range.

Network members identified development proposals affecting 22 of the beach areas surveyed including 14 involving housing development, four involving resort development, and five involving marina development. Other proposals identified include plans to construct an artificial reef at Leighton Beach.

Network members use additional comments to highlight a number of issues including: impacts of stormwater and sewage on the marine environment; the overfishing of whitebait and abalone; impacts of pedestrian traffic and four wheel drives on dunal areas; and ongoing urbanisation of the coast.

- •• moderate to heavily populated: high impacts in parts


Becher Point to Two Rocks
1. Becher Point to Warnbro Carpark
2. Warnbro Carpark to Malibu Road
3. Malibu Road to Mersey Point
4. Penguin Island
5. Mersey Point to Boundary Road
6. Boundary Road to Garden Is. Causeway
7. Garden Is Causeway to Palm Beach Jetty
8. Palm Beach Jetty to CBH Grain Terminal
9. Kwinana Beach
10. Woodman Point / Jervoise Bay
11. Owen Anchorage
12. Coogee to Port Fremantle
13. Port Beach
14. Leighton Beach
15. Cottlesloe Beach
16. Swanbourne Beach
17. City Beach
18. Floreat Beach
19. Scarborough Beach
20. Contacio's Beach
21. Trigg Beach
22. Cleggies group (North Trigg Beaches)
23. Mettam's Beach
24. Waterman Beach
25. Sorrento Beach
26. Whitfords Beach
27. Mullaloo Beach
28. Burns Beach
29. Mindarie Beach
30. Wannaroo Beach
31. Jindalee Beach
32. Alkimos Beach
33. Eglinton Beach
34. Yanchep Beach
35. Two Rocks Beach
Two Rocks
Yanchep
Indian Ocean
PERTH
Fremantle
Rottnest Island
Cockburn Sound
Garden Island
Kwinana
Rockingham
Shoalwater
Warnbro Sound
Becher Point
N
Scale
0
10
20
km

Two Rocks to Steep Point

Length of Coastline: 800 km (approximate estimate)

Number of Surveys: 45

Coverage: Good

Two Rocks to Steep Point is a sparsely populated coastline dominated by the mainland beaches between Two Rocks and Geraldton and the rocky coast between Geraldton and Steep Point. Coastal settlements include Guilderton, Ledge Point, Lancelin, Cervantes, Dongara, Geraldton and Kalbarri. Approximately five per cent of the coastline is held in conservation tenure, invcluding the Nambung, Kalbarri and Zuytdorp national parks.

Network members returned 45 surveys: 40 for individual beach areas, three group surveys including two for Wedge and Cocos Islands, and two section surveys. Lengths of beach areas surveyed range from 500 metres to 120 kilometres.

According to network members, eight of the beach areas surveyed are without dunes including two beach areas that have lost their dunal system to urban development. Where dunes exist they can be quite extensive ranging in height from three to 100 metres, and width from seven metres to 2000 metres. Network members did not identify any exotic or other non-native flora at beach areas surveyed.

According to network members, 14 of the beach areas surveyed are located in urban areas and a further 21 have property and/or infrastructure development within 250 metres from the high tide mark. Network members identified stormwater outlet pipes at three of the beach areas surveyed, none of which had litter evident in the vicinity of pipe discharge at the time of survey.

The only sewerage outfall discharging in the vicinity of beach areas surveyed is located on Cocos Island and services the quarantine station.

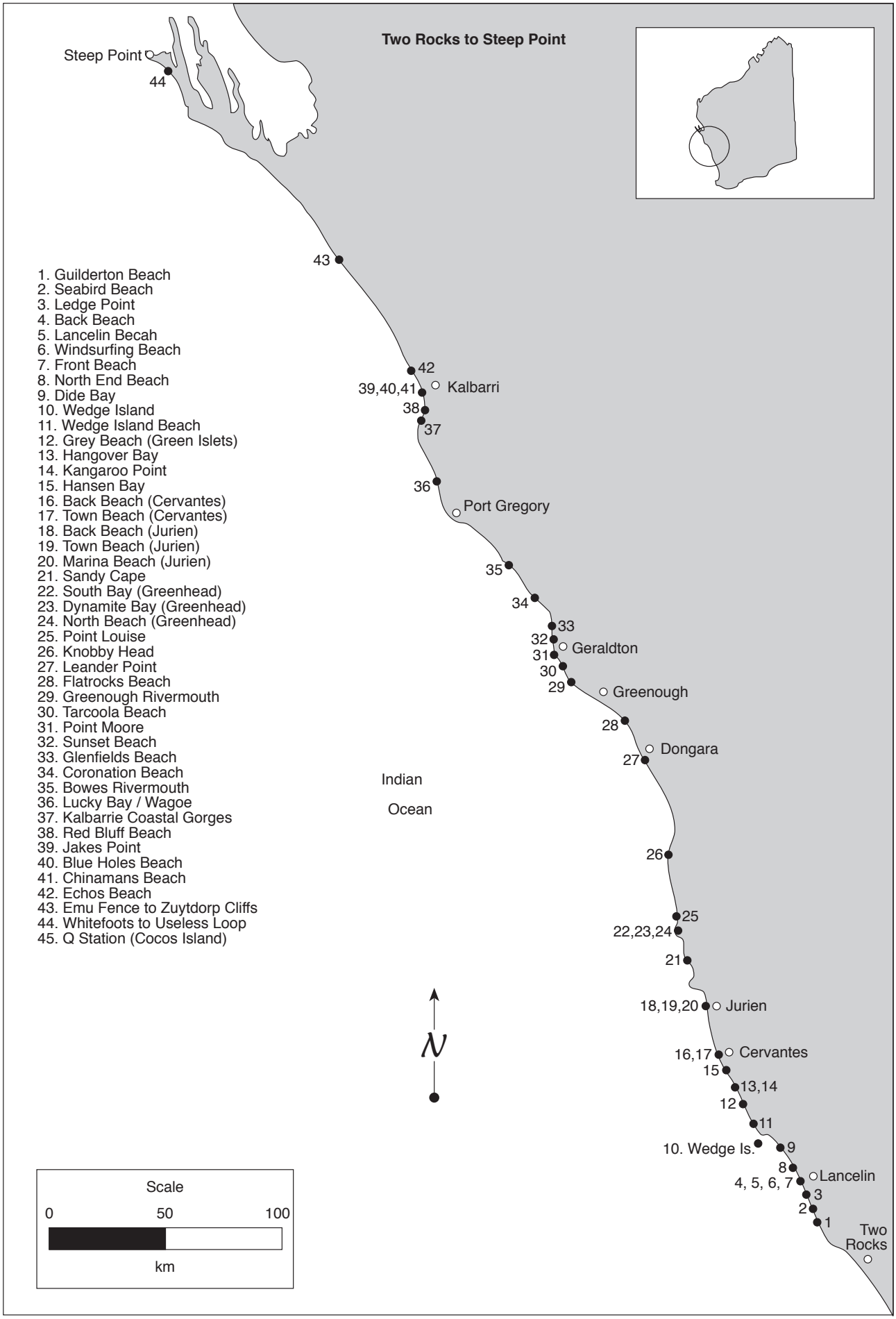
Network members identified four rivers as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff and, in the case of the Murchison River, general wastes and oil from cray fishing boats.

Public access to the beach areas surveyed is, in the main, unrestricted, although network members note one beach area where access requires a permit from the adjacent land holder.

Network members identified development proposals affecting 12 of the beach areas surveyed including four involving housing development, two involving resort development, and two involving marina development. Of particular note is the Oakajee Industrial Development proposal for coastal land immediately adjacent to Coronation Beach just north of Geraldton. The stated intentions of this proposal is to provide a site in the Geraldton region for use as a future heavy industrial estate. Given the impacts associated with other industrial sites situated on the coast, Kwinana for example, it comes as no surprise that many in the local community are vehemently opposed to this development and see it as a direct threat to other more sustainable industries like tourism and fishing.

Network members use additional comments to highlight a number of issues including the impacts of off-road vehicles on dunal areas and litter.

•••• sparsely populated: low impacts


Two Rocks to Steep Point
Steep Point
44
43
42
39,40,41
Kalbarri
38
37
36
Port Gregory
35
34
33
32
Geraldton
31
30
29
Greenough
28
Dongara
27
Indian
Ocean
26
25
22,23,24
21
18,19,20
Jurien
16,17
Cervantes
15
13,14
12
11
10. Wedge Is.
9
8
4, 5, 6, 7
Lancelin
3
2
1
Two
Rocks
1. Guilderton Beach
2. Seabird Beach
3. Ledge Point
4. Back Beach
5. Lancelin Becah
6. Windsurfing Beach
7. Front Beach
8. North End Beach
9. Dide Bay
10. Wedge Island
11. Wedge Island Beach
12. Grey Beach (Green Islets)
13. Hangover Bay
14. Kangaroo Point
15. Hansen Bay
16. Back Beach (Cervantes)
17. Town Beach (Cervantes)
18. Back Beach (Jurien)
19. Town Beach (Jurien)
20. Marina Beach (Jurien)
21. Sandy Cape
22. South Bay (Greenhead)
23. Dynamite Bay (Greenhead)
24. North Beach (Greenhead)
25. Point Louise
26. Knobby Head
27. Leander Point
28. Flatrocks Beach
29. Greenough Rivermouth
30. Tarcoola Beach
31. Point Moore
32. Sunset Beach
33. Glenfields Beach
34. Coronation Beach
35. Bowes Rivermouth
36. Lucky Bay / Wagoe
37. Kalbarrie Coastal Gorges
38. Red Bluff Beach
39. Jakes Point
40. Blue Holes Beach
41. Chinamans Beach
42. Echos Beach
43. Emu Fence to Zuytdorp Cliffs
44. Whitefoots to Useless Loop
45. Q Station (Cocos Island)
N
Scale
0
50
100
km

Steep Point to Cape Keraurdren

Length of Coastline: 1900 km (approximate estimate)

Number of Surveys: 63

Coverage: Reasonable

Steep Point to Cape Keraurdren is a sparsely populated coastline recognised, along with the rest of the north west, as a rugged and harsh environment in which to live. Its shores are largely infertile and subject to tides of prodigious range. Shark Bay is a prolific fish breeding ground popular with offshore game fishermen. The Peron Peninsula in the middle of Shark Bay is recognised by locals as a national park and is home to the coastal settlements of Denham and Monkey Mia. Carnarvon with a population of approximately 6000 is the centre of highly developed fishing and prawning industries. The North West Cape boasts the splendour of both the Ningaloo Coral Reef and the Cape Range national park. The Ningaloo Coral Reef is the largest coral reef in Western Australia and teems with no less than 500 species of fish and about 220 species of reef building corals. It is protected by the Ningaloo marine park which extends for some 260 kilometres along the North West Cape. The town of Exmouth, created during the construction of the American North West Cape communication base, supports large scale fishing and prawning industries and has a booming tourism industry. Other coastal settlements include the industrial towns of Dampier, Karratha, Wickham and Port Hedland.

Network members returned 63 surveys providing intermittant but reasonable coverage throughout the region. Of the surveys, 59 are for individual beaches and four are groups surveys including two for Downes and Finucane Islands. Lengths of beach areas surveyed range from 200 metres to 30 kilometres.

According to network members, 16 of the beach areas surveyed are without dunes including three that have lost their dunal system to urban development. Where dunes exist they are generally moderate in size, ranging in heights from two to 10 metres, and widths from four to 200 metres. Network members identified exotic and other non-native flora at 13 of the beach areas surveyed. Species identified include Buffel grass and Kapok bush.

According to network members, six of the beach areas surveyed are located in urban areas, and a further 31 have property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at five of the beach areas surveyed, three of which had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter type found were plastic bags.

There are no public sewerage outfalls discharging in the vicinity of beach areas surveyed. All sewage is handled via septics or stabilisation ponds.

Network members identified four creeks, one harbour and one bay as sources of beach pollution via their respective catchments. Pollution sources include industrial effluent, urban runoff, litter and debris.

Public access to beach areas surveyed is, in the main, unrestricted, although network members note four beach areas where access is hindered by private property. In addition to these, there are four beach areas which are closed because of the Clough Resources Mining Lease at Useless Loop.

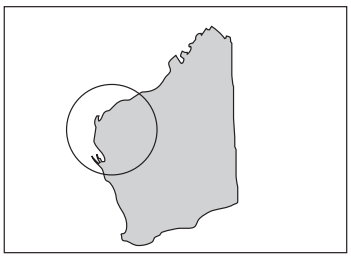
Network members identified development proposals affecting 13 of the beach areas surveyed including two involving resort development and four involving industrial development including a proposal for a new power station and iron ore processing plant at Hearsons Cove.

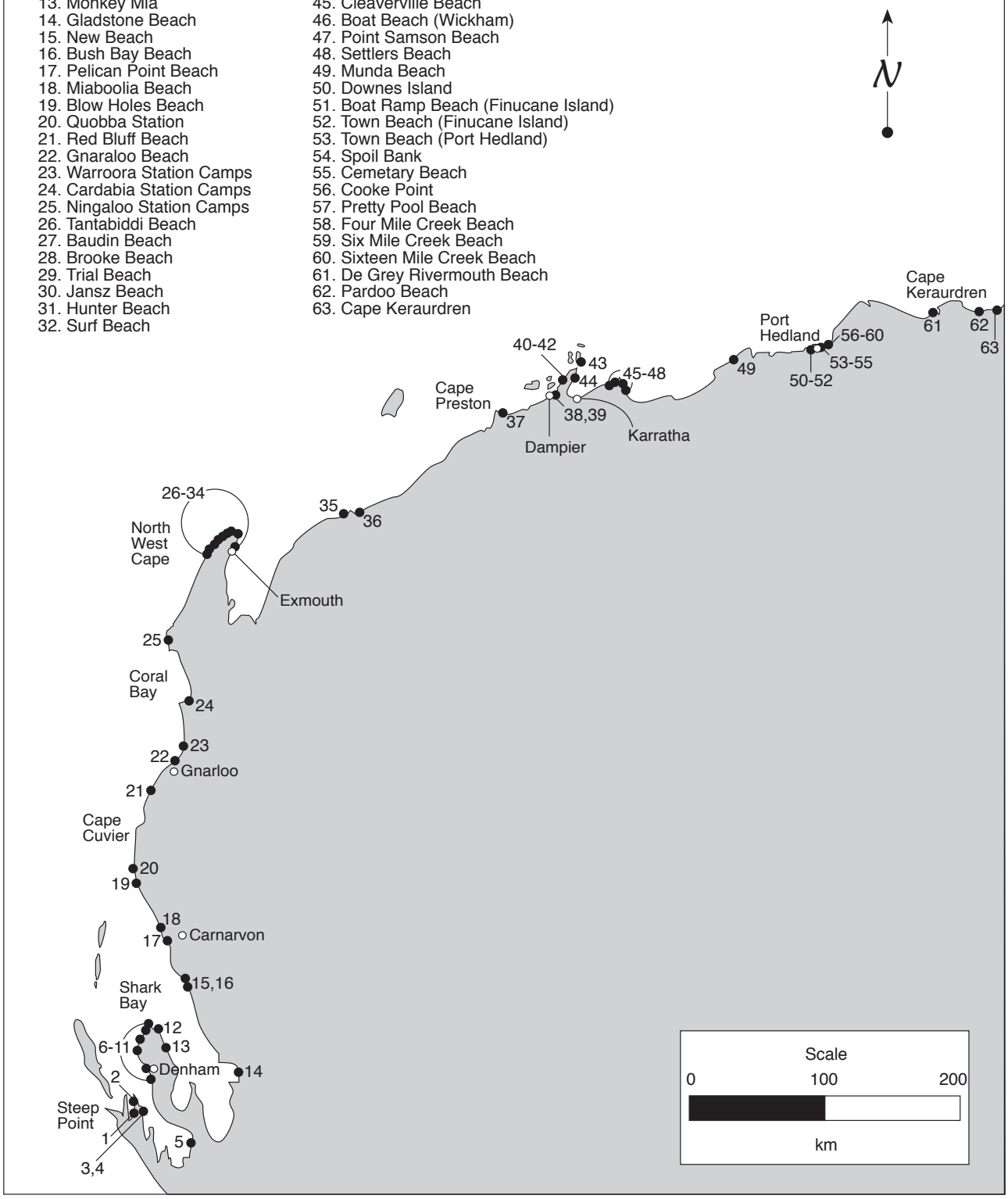
Network members use additional comments to highlight a number of issues including: the impacts of four wheel drives on dunal areas; impacts of industrial waste water on estuarine and marine environments; and litter, particularly fishing related debris.

••• sparsely populated: moderate impacts in places

Steep Point to Cape Keraurdren

1. Cosy Corner
2. Pearling Camp
3. Town Beach
4. Tourist Beach
5. Nanga Bay
6. Denham Townsite
7. Big Lagoon
8. South Gregories
9. Gregories
10. Bottle Bay
11. Cape Peron
12. Herald Bight
13. Monkey Mia
14. Gladstone Beach
15. New Beach
16. Bush Bay Beach
17. Pelican Point Beach
18. Miaboolia Beach
19. Blow Holes Beach
20. Quobba Station
21. Red Bluff Beach
22. Gnaraloo Beach
23. Warroora Station Camps
24. Cardabia Station Camps
25. Ningaloo Station Camps
26. Tantabiddi Beach
27. Baudin Beach
28. Brooke Beach
29. Trial Beach
30. Jansz Beach
31. Hunter Beach
32. Surf Beach
33. Bundegi Beach
34. Town Beach (Exmouth)
35. Sunset Beach
36. Town Beach (Onslow)
37. Forty Mile Beach
38. Main Beach (Dampier)
39. Shark Cage Beach
40. Mermaid Beach
41. Withnell Bay
42. Conzinc Bay
43. Searipple Passage Beach
44. Hearsons Cove
45. Cleaverville Beach
46. Boat Beach (Wickham)
47. Point Samson Beach
48. Settlers Beach
49. Munda Beach
50. Downes Island
51. Boat Ramp Beach (Finucane Island)
52. Town Beach (Finucane Island)
53. Town Beach (Port Hedland)
54. Spoil Bank
55. Cemetary Beach
56. Cooke Point
57. Pretty Pool Beach
58. Four Mile Creek Beach
59. Six Mile Creek Beach
60. Sixteen Mile Creek Beach
61. De Grey Rivermouth Beach
62. Pardoo Beach
63. Cape Keraurdren





Cape Keraurden to NT border

Length of Coastline: 1200 (approximate estimate)

Number of Surveys: 17

Coverage: Poor

Cape Keraurdren to the Northern Territory border is a sparsely populated coastline, much of it inaccessible. The region is dominated by mainland beaches between Cape Karaurdren and Cape Leveque, and rocky coasts, mudflats and mangrove habitats along the Kimberley coastline. Coastal settlements include Broome, Derby and Wyndham. In addition, there are a number of Aboriginal communities located on the coast. Approximately three-quarters of the Kimberley coastline is held in Aboriginal Land Trusts.

Network members returned 17 surveys providing good coverage between Cape Keraurdren and Cape Leveque, but poor coverage everywhere else. All of the surveys are for individual beaches. Lengths range from 200 metres to 20 kilometres.

According to network members, five of the beach areas surveyed are without dunes, four because they are located inside protected waters, and one because it is located at the bottom of a cliff. Where dunes exist they are generally moderate in size ranging from three to 40 metres in height and up to 500 metres wide in places. Network members identified exotic and other non-native flora at two of the beach areas surveyed. Species identified include Aerva Javania and Buffel grass.

According to network members, two of the beach areas surveyed are located in urban areas and a further seven have property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at two of the beach areas surveyed, one of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident included food wrappers and cans.

There are no public sewerage outfalls discharging in the vicinity of beach areas surveyed, although there is a small outlet from the Broome jetty toilets at Entrance Point Beach. All sewage in the region is handled via septics or stabilisation ponds.

Public access to the beach areas surveyed is in the main unrestricted, although access to Aboriginal areas require a permit.

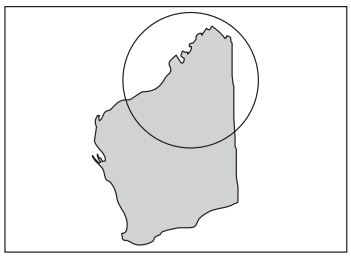
The only development proposal identified by network members is an extension to the Cable Beach Club Resort.

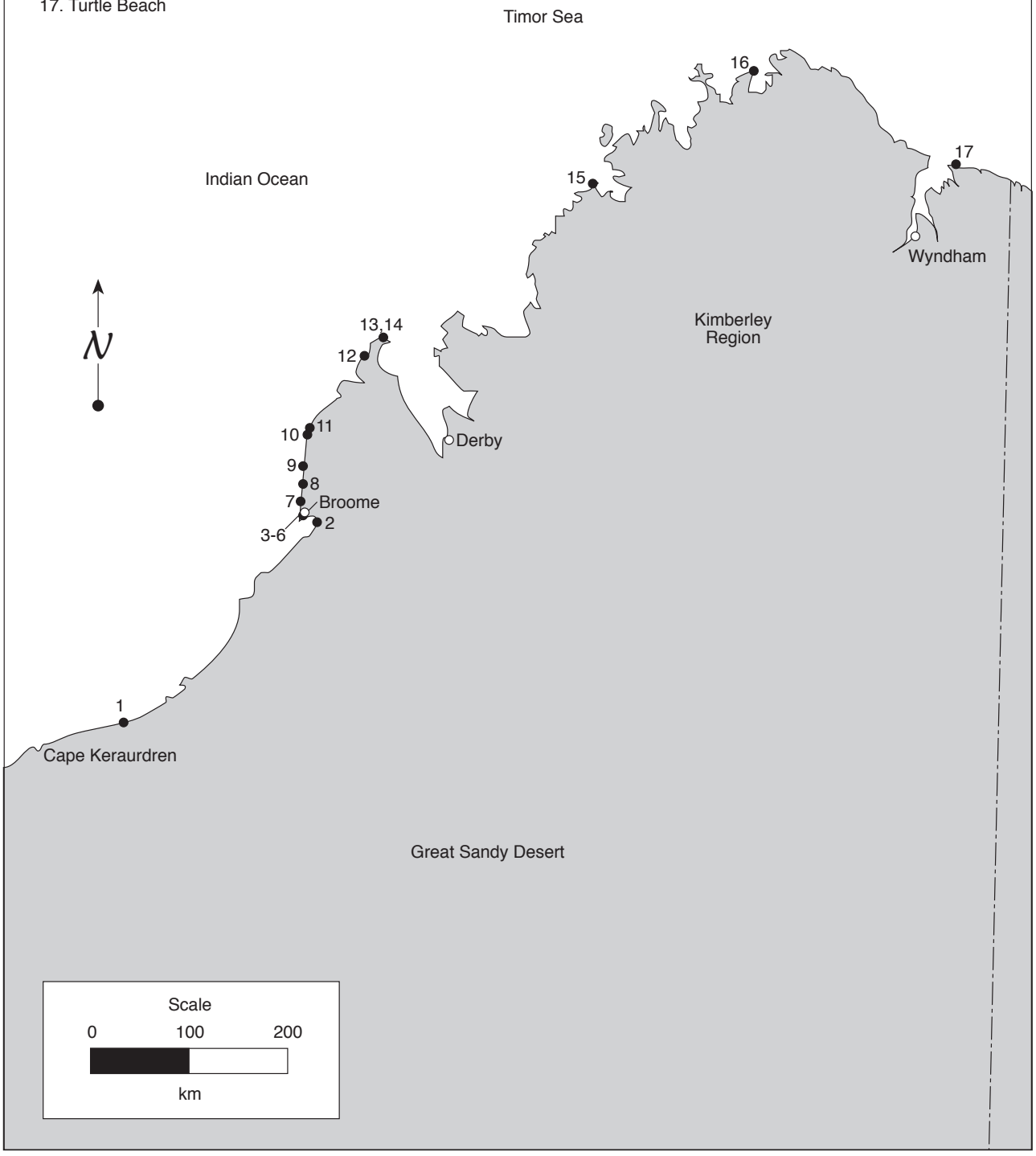
Network members use additional comments to highlight a number of issues including: the impact of four wheel drives on dunal areas; litter from offshore sources including recreational and commercial fishing vessels.

•••• 1/2 sparsely populated: low impacts; untouched in parts

Cape Keraurdren to NT Border

1. Eighty Mile Beach
2. Crab Creek Beach
3. Town Beach (Broome)
4. Meatworks Beach
5. Entrance Point Beach
6. Riddell Beach
7. Cable Beach
8. Coconut Wells Beach
9. Quondong Beach
10. Manari Beach
11. Point Coulomb Beach
12. Carnot Bay Beach
13. West Beach (Cape Leveque)
14. East Beach (Cape Leveque)
15. Mermaid Beach (Careening Bay)
16. West Bay
17. Turtle Beach





Rottnest Island

Length of Coastline: 40 km (approximate estimate)

Number of Surveys: 27

Coverage: Excellent

Rottnest Island is located approximately 18 kilometres west of Fremantle and was originally established, following European colonisation, as an Aboriginal penal settlement in 1839. The island is now a nature reserve and has a small resident population, together with holiday villas located at Thompson Bay, Geordie Bay and Longreach Bay. The island is accessible via ferry from Perth, and is a popular holiday and tourist destination. Visitor numbers and activities are strictly regulated to minimise impacts on the environment.

Network members returned 27 surveys covering every beach on the island. Beach lengths range from 100 metres to 2.5 kilometres.

According to network members, there are five beaches without dunes. Dune sizes recorded by network members range in heights from three to 40 metres, and widths from 10 to 500 metres.

The settlements of Thompson, Geordie and Longreach Bays infringe to within 50 metres of the high tide mark at adjacent beaches. In addition there is a road that traverses the island and infringes to within 250 metres at 21 of the beach areas. Network members identified stormwater outlet pipes at five beach areas, none of which had litter evident in the vicinity of pipe discharge at the time of survey.

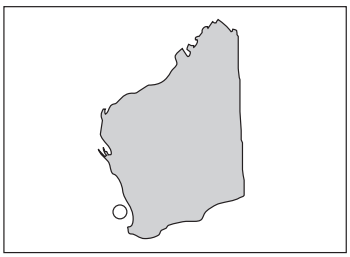
The island has a new aerobic sewerage treatment plant that replaces the previously used Point Clune sewerage outfall. This new plant uses best available technology to minimise impacts on the local environment.

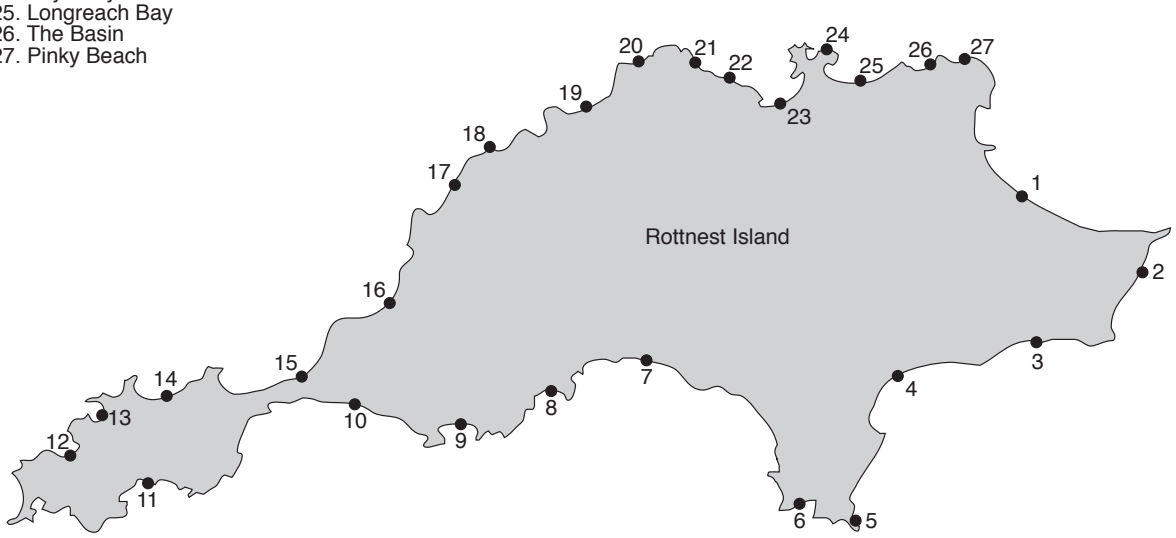
According to network members the biggest issue affecting beaches on the island is the discharge of waste, litter and debris from recreational vessels.

•••• nature reserve island popular with tourists: low impacts

Rottnest Island

1. Thomson Bay
2. Bickley Bay
3. Paterson Beach
4. Porpoise Bay
5. Parker Point
6. Little Salmon Bay
7. Salmon Bay
8. Nancy Cove
9. Mary Cove
10. Strickland Bay
11. Wilson Bay
12. Eagle Bay
13. Mabel Cove
14. Marjorie Bay
15. Lady Edeline Beach
16. Stark Bay
17. Ricey Beach
18. City of York Bay
19. Catherine Beach
20. Little Armstrong Bay
21. Parakeet Bay
22. Little Parakeet Bay
23. Geordie Bay
24. Fays Bay
25. Longreach Bay
26. The Basin
27. Pinky Beach





Indian Ocean

N

Scale

0 1 2

km

Islands managed by CALM in the Pilbara Region

Length of Coastline: n/a

Number of Surveys: 10

Coverage: Good

Islands managed by the Department of Conservation and Land Management (CALM) in the Pilbara region number more than 100. The majority are protected by conservaion tenure including nature reserves, conservation and recreation reserves, and conservation parks. In addition to conservation tenure, there are oil and gas industry shorebase leases on Airlie, Barrow, Thevenard and Varanus Islands. The majority of islands are not used by the public and access is closed to the public. Others are used quite extensively for recreational fishing, camping and diving, for example some of the larger islands in the Dampier Archipelago.

Network members returned 10 surveys: four for individual islands and six for island groupings. The following text is based on comments provided by network members.

Airlie, Barrow, Thevenard, and Varanus Islands (Islands with oil and gas industry shorebase leases)

Airlie, Barrow, Thevenard and Varanus Islands have shorebase leases belonging to companies involved in offshore oil and gas operations. Outside of these shorebase lease areas the islands are protected by nature reserves. Activities within the lease areas are strictly regulated. Public access is generally restricted, although Thevenard island has a small tourist resort and public jetty. Nature reserve areas are also out of bounds to the mining companies.

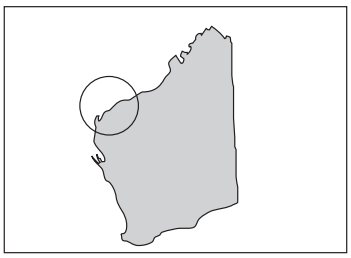
Beach areas have small dunal systems that are well vegetated and free from exotic and non-native species with the exception of Buffel grass and some other exotic grasses. Mining company employees are encouraged to look out for any weed species that germinate after rain and all companies have strict quarantine regulations.

There is infrastructure development associated with the shorebase leases consisting mainly of storage tanks, living quarters and processing equipment. This infrastructure is, as a rule, located close to the high tide mark (often to within 50 metres) in order to minimise infringement into adjacent nature reserve areas. Undersea pipelines transport oil and gas from the islands to the mainland.

Each of the shorebase leases has its own sewerage treatment plant and these are closely monitored as part of the operating licence requirements.

Islands managed by CALM in the Pilbarra region

1. Thevenard Island
2. Airlie Island
3. Barrow Island
4. Varanus Island
5. Great Sandy Islands
6. Monte Bello Islands
7. Special Conservation Zone (Dampier Archipelago)
8. Conservation Zone (Dampier Archipelago)
9. Recreational Zone (Dampier Archipelago)
10. Recreational Reserves (Dampier Archipelago)



Great Sandy Islands Nature Reserve

The Great Sandy Islands are generally small in size and surrounded by beach. To give some idea of the size of these islands, circumferences range from 350 metres to 6.6 kilometres.

The islands are B Class nature reserves and therefore day access is permitted, however there is to be no lighting of fires, camping, firearms nor any other disturbance of flora and fauna. Recreational fishers use some of the beaches but most are rarely, if ever, visited by the public.

There is no residential and/or infrastructure development on the islands, nor are there any exotic or other non-native flora species. The only impacts are litter from offshore sources and/or left behind by recreational users.

Montebello Islands

The Montebello islands are a cluster of very small islands that were declared as C Class Conservation Parks in 1992. This tenure allows restricted access similar to that imposed for nature reserves.

There are three sites where nuclear weapons testing was conducted in the 1950s and these are marked with appropriate signage and restricted access.

Network members are not sure if there are exotic flora species present on the islands, however, given the proximity to Barrow and Varanus it is quite possible that they have Buffel grass or some other exotic grasses.

The only infrastructure developments are a CALM research shack and another shack used by a pearling company.

According to network members, the only recreational groups currently using these islands are fishers and divers.

CALM considers the habitats of these islands to be extremely fragile and unable to support any major development and/or infrastructure. CALM has invited public comment regarding future use of this area along the lines of marine-based ecotourism operations that do not require land development.

Dampier Archipelago

Islands in the Dampier Archipelago have lots of beach areas, some of which are regularly accessed by the public. Zonings imposed by the current managment plan generally correspond to levels of use. Beach areas zoned for recreation are the most popular and have shacks provided for this purpose, whilst those zoned for camping are used to a more moderate extent. The rest comprise A, B, and C Class nature reserves and have restricted access.

Dunal systems are generally moderate in size, ranging from five to 10 metres in height and up to 50 metres wide in some locations. According to network members, there are exotic flora, predominately Buffel grass and Kapok bush, on most of the islands. CALM undertakes regular spraying programs to keep the weeds in check.

Network members note some litter associated with recreational use including items such as aluminium cans, PET bottles, plastic bags and fishing line.

Other concerns include the environmental risks associated with shipping that uses a channel through this group of islands. Commodities being shipped include iron ore, liquified natural gas and salt.

•••• 1/2 nature reserve islands: low impacts; untouched in parts

3.7 Tasmania

Tasmania has a coastline, including major islands, of approximately 3200 kilometres[14]. Along the mainland coast there are around 808 beaches[4]. The survey targeted all areas of the mainland coast and Flinders and King Islands.

Network members returned 173 surveys providing data on 155 mainland beach areas and 18 island beach areas. Of the surveys, 162 are for individual beaches, seven are for groups of two or more beaches, and four are for beach areas between two geographic points.

According to network members, 33 (19 per cent) of the beach areas surveyed are without dunes including five that have lost their dunal system to urban development. Network members identified exotic and other non-native flora at 56 (32 per cent) of the beach areas surveyed. Species identified are predominately common knowledge species like Blackberries, Caprosma, Marram grass and Pine trees. Other species identified include Box Thorn, Lupins, Rosehip, South African Boneseed and Pampas grass.

According to network members, 35 (20 per cent) of the beach areas surveyed are located in urban areas and 142 (77 per cent) have property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at 45 (26 per cent) of the beach areas surveyed, 24 of which had litter evident in the vicinity of pipe discharge at the time of survey. The four most common litter categories evident were plastic bags (75 per cent), food wrappers (67 per cent), cans (67 per cent) and cigarette butts (62 per cent).

Network members identified 30 public sewerage outfalls discharging in the vicinity of beach areas surveyed: 20 discharge to the ocean and 10 discharge to estuaries. Treatment standards vary: 24 discharge secondary treated effluent or better, five discharge primary treated effluent, and one discharges screened effluent. There is no effluent re-use occurring from any of these systems and the outfalls have a combined discharge of approximately 75 million litres per day.

Network members listed 36 water courses, including 17 rivers and 16 creeks, as sources of beach pollution via their respective catchments. Pollution sources include urban runoff (62 per cent), agricultural runoff (61 per cent), litter and debris (40 per cent).

There was litter evident at approximately 90 per cent of the beach areas surveyed. The four most common litter categories evident were cigarette butts (72 per cent), food wrappers (69 per cent), cans (65 per cent) and plastic bags (58 per cent).

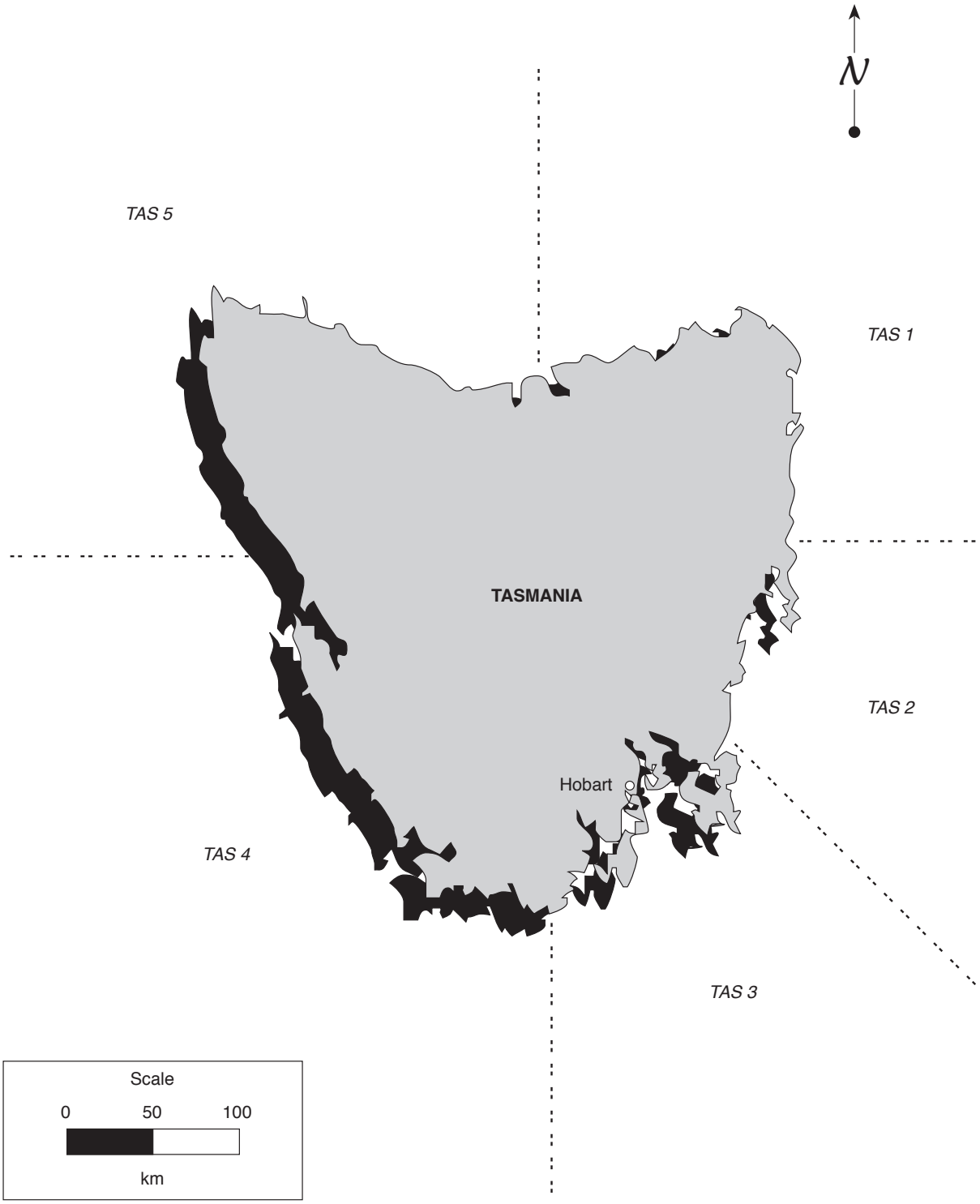
Network members identified development proposals affecting 17 (10 per cent) of the beach areas surveyed including 10 involving housing development, one involving resort development and one involving marina/canal development.

Public access to beach areas surveyed is, in the main, unrestricted, although network members note16 beach areas where access is hindered by private property. A further three beaches are closed to the public because of private property.

Network members use additional comments to highlight a number of issues and these are covered in the regional summaries.

Tasmania coastal regions

TAS 1. Tamar River to Cape Lodi and Flinders Island
TAS 2. Cape Lodi to Marion Bay
TAS 3. Marion Bay to South East Cape
TAS 4. South East Cape to Trial Harbour
TAS 5. Trial Harbour to Tamar River and King Island



Tamar River to Cape Lodi

Length of Coastline: 350km (approximate estimate)

Number of Surveys: 34

Coverage: Reasonable

Tamar River to Cape Lodi is a rugged and sparsely populated coastline dominated by mainland beaches. Coastal settlements including Low Head, Bridport, St Helens and Bicheno. Conservation reserves include the Mount William National Park which protects approximately 40 kilometres of coastline between Cape Naturaliste and Ansons Bay.

Network members returned 34 surveys: 32 for individual beaches, one group survey covering beach areas in Mount William National Park, and one section survey covering beach areas between Burial Point and Red Rock Point. Lengths of beach areas surveyed range from 500 metres to 10 kilometres.

According to network members six of the beach areas surveyed are without dunes including Four Mile Creek which has lost its dunal area to urban development. Dunes range in size from heights of three to 30 metres and widths from four to 500 metres.

According to network members, 11 of the beach areas surveyed are located in urban areas and a further 16 have property and/or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at five of the beach areas surveyed, one of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include cans and cigarette butts.

Network members identified three public sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Georgetown, Bridport and St Helens. All three discharge secondary treated effluent: two to the ocean and one to an estuary.

Network members identified three rivers and seven creeks as sources of beach pollution via their respective catchments. Pollution sources include urban runoff, agricultural runoff and sewage.

Flinders Island

Length of Coastline: 150km (approximate estimate)

Number of Surveys: 2

Coverage: Poor

Flinders Island is located approximately 180 kilometres north-east of Devonport and has a resident population of approximately 1100. Coastal settlements include Whitemark, Emita and Palana. The economic mainstays are grazing, fishing and farming with tourism becoming increasingly important. The island is surrounded by more than 100 tiny beaches and coves.

Network members returned two surveys: one for Whitemark Beach and the other a group survey representing other beaches on the island including Fotheringate Bay, Trousers Point Beach, Buffalo's Beach, Badger Corner, Yellow Beach, White Beach, Foo Chow Beach, Palana Beach, Killiecrankie Bay, Egg Beach, Marshall Bay, Tanners Bay, Allports Beach, Emita Beach, Blue Rocks, Sawyers Bay and Long Point.

According to network members, Whitemark Beach has property development within 50 metres of the high tide mark and a sewerage outfall located at the end of the Whitemark wharf which discharges secondary treated effluent from the Whitemark Hospital.

All other beaches on the island are said to be free of impacts apart from small quantities of litter left behind by recreational users and/or from offshore sources.

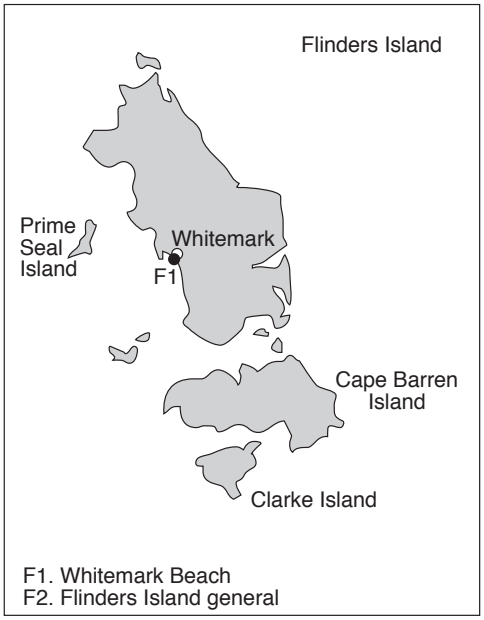
Public access to the beach areas surveyed is, in the main, unrestricted, although network members note nine beach areas where access is hindered by beach front property.

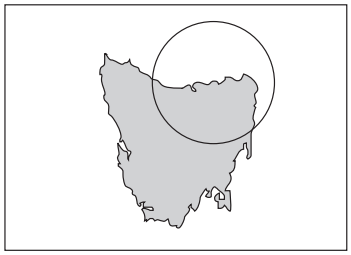
Network members identified development proposals affecting five of the beach areas surveyed, all involving housing development.

Network members use additional comments to highlight a number of issues including the impacts of pedestrian traffic and four wheel drives on dunal areas.

•••• sparsely populated: low impacts

Tamar River to Cape Lodi and Flinders Island





N

Cape Portland
Waterhouse point
Cape Naturaliste
Eddystone point
Bridport
George Town
St Helens
Binalong bay
Bicheno
Cape Lodi

1. Deceitful Cove
2. East Beach
3. Bell Buoy Beach
4. Beechford Beach
5. Maitland Bay
6. Tam O'Shanter Bay
7. Weymouth Beach
8. Saint Albans Bay
9. Lade Beach
10. Adams Beach
11. Town Beach
12. Waterhouse Beach
13. Ranson Beach (West Tomahawk)
14. Tomahawk Beach
15. Boobyalla Beach
16. Great Musselroe Bay
17. Mt William N.P. Beaches
18. Ansons Bay
19. Beer Barrel Beach
20. Maurouard Beach (Perons)
21. Dianas Beach
22. Beaumaris Beach
23. Wrinklers Beach
24. Steels Beach (Scamander)
25. Mariposa Point Beach
26. Four Mile Creek Beach
27. Burial Point to Red Rock Point
28. Lagoons and Little Beach
29. Templestowe Beach
30. Seymour Beach
31. Denison Beach
32. Golf Course Beach
33. Red Bill Beach
34. Rice Beach

Scale
0 20 40
km

Cape Lodi to Marion Bay

Length of Coastline: 325 km (approximate estimate)

Number of Surveys: 33

Coverage: Reasonable

Cape Lodi to Marion Bay takes in the coastal settlements of Swansea, Triabunna and Orford. Elsewhere the coastline is sparsely populated. Conservation reserves include the Freycinet National Park.

Network members returned 33 surveys including two for beach areas on Schouten Island. All but four of the surveys are for individual beaches, the exceptions being two section surveys and two group surveys. Lengths of beach areas surveyed range from 400 metres to 14 kilometres.

According to network members, all but two of the beach areas surveyed have a dunal systems. Dunes are generally moderate in size ranging in heights from one to four metres and widths from five to 300 metres. Network members identified exotic and other non-native flora at 19 of the beach areas surveyed including Marram grass, Rosehip, Boxthorn and Blackberries.

According to network members only one of the beach areas surveyed is located in an urban area although 19 have property or infrastructure development within 250 metres of the high tide mark. Network members identified stormwater outlet pipes at six of the beach areas surveyed, two of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident in the vicinity of pipe discharge include food wrappers, plastic bags and cans.

Network members identified two public sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Triabunna and Orford. The outfall at Triabunna discharges secondary treated effluent into Spring Bay whilst the Orford outfall discharges primary treated effluent into the ocean.

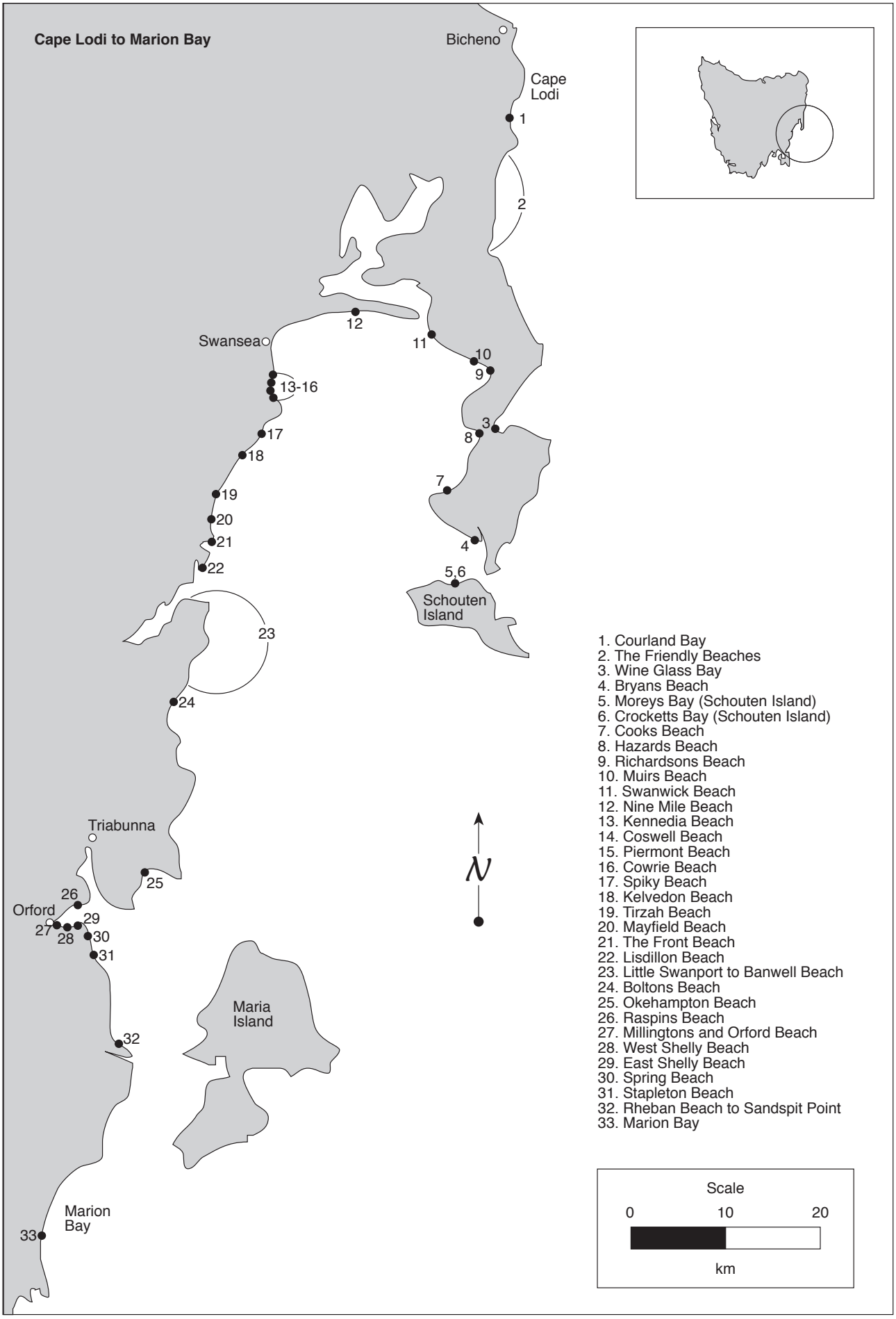
Network members identified one river and four creeks as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff.

Public access to the beach areas surveyed is, in the main, unrestricted, although there are three beach areas where, according to network members, access is hindered by private property.

Network members identified development proposals affecting three of the beach areas surveyed, all three involve housing development and one incorporating a resort and marina as well.

Network members use additional comments to highlight a number of issues including the impacts of pedestrian traffic, four wheel drives and grazing animals on dunal areas. At risk from vehicular traffic in certain beach areas are colonies of shore nesting birds including the Hooded Plover.

••• 1/2 sparsely populated: moderate impacts associated with recreational use and farming


Cape Lodi to Marion Bay
Bicheno
Cape Lodi
Swansea
Schouten Island
Triabunna
Orford
Maria Island
Marion Bay
1. Courland Bay
2. The Friendly Beaches
3. Wine Glass Bay
4. Bryans Beach
5. Moreys Bay (Schouten Island)
6. Crocketts Bay (Schouten Island)
7. Cooks Beach
8. Hazards Beach
9. Richardsons Beach
10. Muirs Beach
11. Swanwick Beach
12. Nine Mile Beach
13. Kennedia Beach
14. Coswell Beach
15. Piermont Beach
16. Cowrie Beach
17. Spiky Beach
18. Kelvedon Beach
19. Tirzah Beach
20. Mayfield Beach
21. The Front Beach
22. Lisdillon Beach
23. Little Swanport to Banwell Beach
24. Boltons Beach
25. Okehampton Beach
26. Raspins Beach
27. Millingtons and Orford Beach
28. West Shelly Beach
29. East Shelly Beach
30. Spring Beach
31. Stapleton Beach
32. Rheban Beach to Sandspit Point
33. Marion Bay
Scale
0 10 20
km

Marion Bay to South East Cape

Length of Coastline: 360km (approximate estimate)

Number of Surveys: 33

Coverage: Reasonable

Marion Bay to South East Cape is a predominately rocky coastline that winds it way into and out of numerous bays and estuaries including the Derwent River estuary. Coastal settlements include the city of Hobart and many others too numerous to mention. Conservation reserves include the Tasman Arch state reserve, Roaring Beach coastal reserve, Browns River Reserve, and Southport Lagoon nature reserve.

Network members returned 33 surveys: all for individual beaches. Lengths of beach areas surveyed range from 150 metres to 10 kilometres.

According to network members there are eight beach areas without dunes including Garden Island Sands that has lost its dunal system to urban development. Dune sizes generally range in height from one to 30 metres and widths from four to 100 metres. Network members identified exotic and other non-native flora at 14 of the beach areas surveyed. Species identified include Marram grass and Blackberries.

According to network members, 13 of the beach areas surveyed are located in urban areas and a further 19 have property and/or infrastructure development within 250 metres of the high tide mark.

Network members identified stormwater outlet pipes at 12 of the beach areas surveyed, 10 of which had litter evident in the vicinity of pipe discharge at the time of survey. Litter categories evident include food wrappers and plastic bags.

Network members identified 10 public sewerage outfalls discharging in the vicinity of beach areas surveyed. These outfalls are located at Port Arthur, Sorell, Midway Point, Rosny Point, Selfs Point, Sandy Bay, Blackmans Bay, Snug, Dover and Southport. All except Sandy Bay and Sorell discharge secondary treated effluent: six discharge to the ocean, and four to the Derwent River estuary.

Network members identified five rivers and four creeks as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff, septic leachate, urban runoff, sewage and litter. The Derwent River in particular is noted as being affected by a wide variety of pollution sources including sewerage outfalls and industrial effluent.

Network members identified development proposals affecting eight of the beach areas surveyed, including four involving housing development and two sandmining proposals.

Network members use additional comments to highlight a number of issues including litter. Network members note that in many outlying beach areas garbage bins are not being serviced properly and these are exacerbating litter problems by encouraging people to leave their litter behind even though the bins are full. Other concerns include the impact of stormwater, sewage and industrial effluent on the water quality of the Derwent River estuary.

•• 1/2 moderately populated: high impacts in parts

Bruny Island

Length of Coastline: 120km (approximate estimate)

Number of Surveys: 3

Coverage: Poor

North Bruny and South Bruny Islands are joined by a narrow isthmus known as 'The Neck'. The islands are a popular tourist destination and have a resident population of approximately 500. There are a number of small coastal reserves and a proposal for a national park on South Bruny Island.

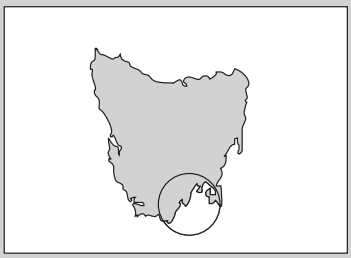
Network members returned three surveys covering the Neck, Cloudy Bay and Alonnah Beach. The Neck and Cloudy Bay both retain dunal systems whilst Alonnah Beach, which faces the protected waters of the D'Entrecasteaux Channel, does not. Non-native flora identified by network members include Marram grass and Radiata Pine.

According to network members the beach areas surveyed are free of impacts and litter is the biggest problem affecting beaches on the island.

•••• sparsely populated: low impacts

Marion Bay to South East Cape including Bruny Island

1. Eagle Hawk Neck
2. Carnarvon Bay Beach
3. Safety Cove
4. White Beach
5. Roaring Beach
6. Park Beach
7. Lewisham Beach
8. Seven Mile Beach
9. Lauderdale Beach
10. Cremorne Beach
11. Clifton Beach
12. Hope Beach (Goats Bluff)
13. Calverts Beach
14. Little Howrah Beach
15. Howrah Beach
16. Bellerive Beach
17. Cornelian Bay Beach
18. Nut Grove Beach
19. Long Beach (Sandy Bay)
20. Kingston Beach
21. Blackmans Bay
22. Snug Beach
23. Coningham Beach
24. Verona Sands
25. Garden Island Sands
26. Randalls Bay
27. Egg and Bacon Bay
28. The Neck (Bruny Island)
29. Cloudy Bay (Small Bruny Island)
30. Alonnah Beach (South Bruny Island)
31. Surveyors Bay
32. Roaring Beach
33. Dover Beach
34. Southport Beach
35. Southport Lagoon
36. Recherche Bay



South East Cape to Trial Harbour

Length of Coastline: 500km (approximate estimate)

Number of Surveys: 15

Coverage: Poor

South East Cape to Trial Harbour is a wild and uninhabited coastline with a rugged mountainous interior and harsh climate that have deterred settlement along all but the sheltered Macquarie Harbour where the township of Strahan is located. Strahan has a population of approximately 500 and is the largest settlement on the west coast. Conservation reserves include the South West national park (442240 hectares) which protects approximately 250 kilometres of coastline. Trial Harbour is a small settlement that was originally established as a port to service the mineral-rich inland slopes of Zeehan and Dundas.

Network members returned 15 surveys including 12 for beach areas inside the South West national park. Lengths of beach areas surveyed range from 500 metres to 30 kilometres.

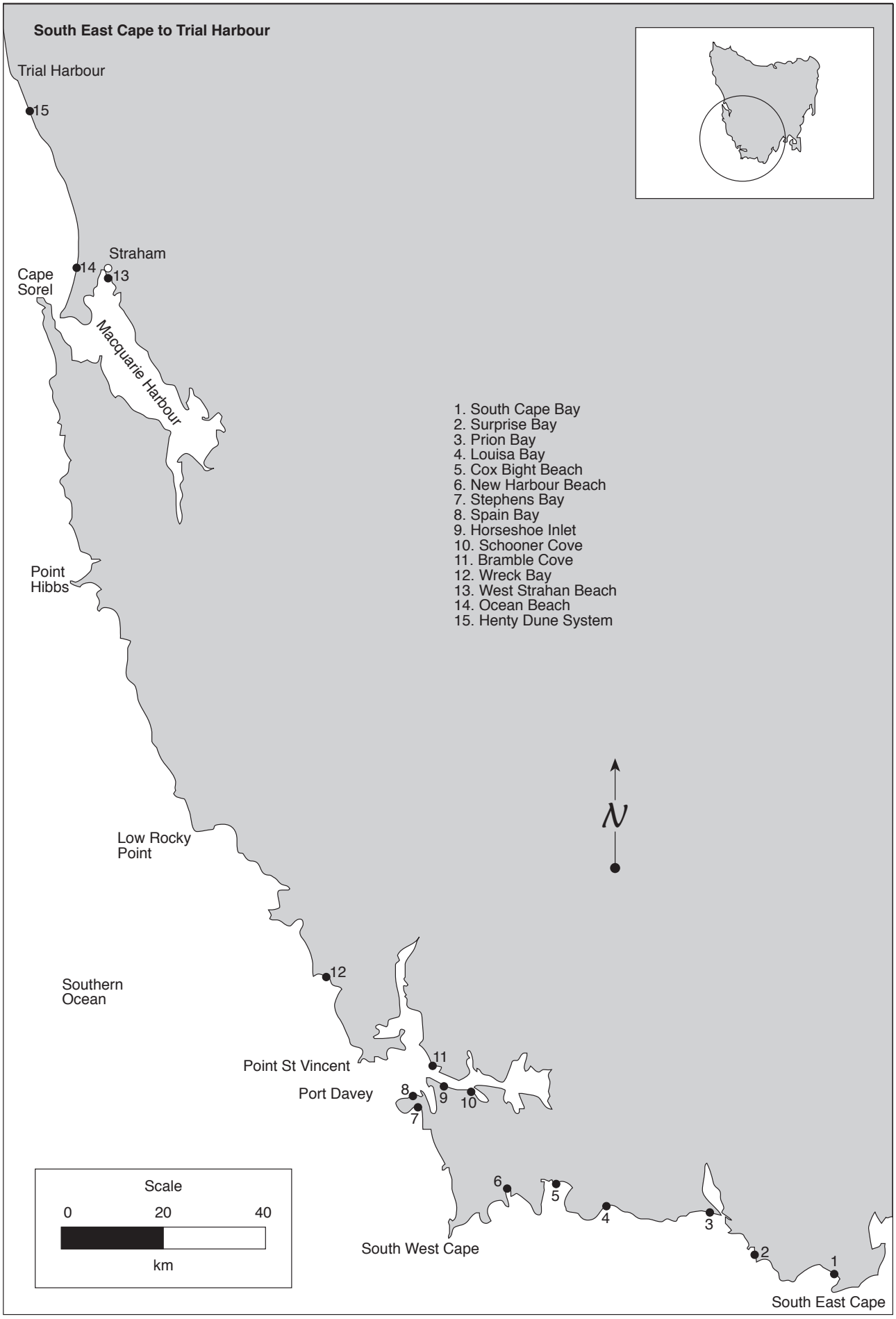
According to network members, four of the beach areas surveyed are without dunes including three that are located inside the protected waters of Port Davey and West Strahan Beach which is located inside the protected waters of Macquarie Harbour. Dune sizes recorded by network members range in height from two to 20 metres and width from five to 200 metres. Network members identified exotic and other non-native flora at Ocean Beach and the Henty Dune System. Species identified include Marram grass, Lupins and Blackberries

According to network members, West Strahan Beach is the only urban beach of those surveyed, although Ocean Beach has infrastructure development within 250 metres of the high tide mark. Network members note a stormwater outlet at West Strahan Beach and a sewerage outfall discharging secondary treated effluent into Macquarie Harbour.

The only river listed by network members as being a source of beach pollution is the King River which receives tailings from the Mt Lyell copper mine.

According to network members, beach areas are generally free of impacts with the exception of litter. Network members note a high incidence of fishing related debris including nets, buoys and ropes and suggest a marine inquiry is needed to examine the impacts of fishing related debris on the otherwise pristine environment of the south-west coast.

•••• 1/2 largely uninhabitated: low impacts; untouched in parts


South East Cape to Trial Harbour
Trial Harbour
15
Straham
14
13
Cape
Sorel
Macquarie Harbour
1. South Cape Bay
2. Surprise Bay
3. Prion Bay
4. Louisa Bay
5. Cox Bight Beach
6. New Harbour Beach
7. Stephens Bay
8. Spain Bay
9. Horseshoe Inlet
10. Schooner Cove
11. Bramble Cove
12. Wreck Bay
13. West Strahan Beach
14. Ocean Beach
15. Henty Dune System
Point
Hibbs
N
Low Rocky
Point
Southern
Ocean
12
Point St Vincent
11
Port Davey
8
9
10
7
Scale
0
20
40
km
6
5
4
3
2
1
South West Cape
South East Cape

Trial Harbour to Tamar River

Length of Coastline: 600km (approximate estimate)

Number of Surveys: 43

Coverage: Reasonable

Trial Harbour to the Tamar River takes in the north coast towns of Burnie, Ulverstone and Devonport. Elsewhere the coastline is sparsely populated particularly along the isolated west coast which has very little in the way of road access. Conservation reserves include the Pieman Protected Area and the Rocky Cape and Asbestos Range national park.

Network members returned 43 surveys including a group survey for Robbins Island. Lengths of beach areas surveyed range from 150 metres to 15 kilometres.

According to network members, 11 of the beach areas surveyed do not retain dunes including three beach areas that have lost their dunal system to urban development. Where dunes exist they are generally moderate in size ranging from one to 10 metres in height and from two to 150 metres in width, although North Beach at Mount Cameron has a dunal area that extends inland for approximately one kilometre. Network members identified exotic and other non-native flora at seven of the beach areas surveyed. Species identified include Marram grass and Pine trees.

According to Network members, eight of the beach areas surveyed are located in urban areas and a further 30 have property and/or infrastructure development within 250 metres of the high tide mark. Where development occurs, it often infringes to within 100 metres of the high tide mark. Network members identified stormwater outlet pipes at 21 of the beach areas surveyed, 11 of which had litter evident in the vicinity of pipe discharge at the time of survey. The most common litter categories found were cans and plastic bags.

Network members identified 11 sewerage outfalls discharging in the vicinity of the beach areas surveyed. These outfalls are located at Smithton, Stanley, Wynward, Somerset, Burnie, Penguin, Ulverstone, Devonport and Port Sorell. All but one discharge secondary treated effluent or better: seven discharge to the ocean and four to estuaries.

Network members identified seven rivers as sources of beach pollution via their respective catchments. Pollution sources include agricultural runoff, urban runoff, industrial effluent and sewage.

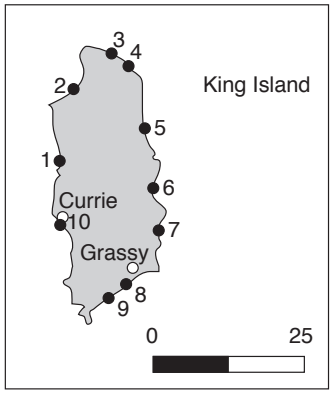
Public access to the beach areas surveyed is, in the main, unrestricted, although network members note one beach area where access is closed because of private property.

Network members identified two development proposals including one involving housing development. The other is a proposal to widen the highway at Ocean Vista beach which will reportedly destroy what little is left of the dunal area.

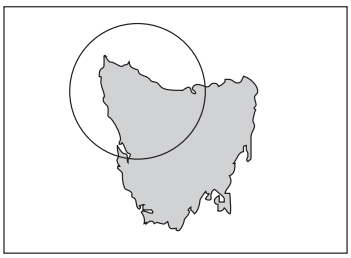
Network members use additional comments to highlight a number of issues including the discharge of industrial effluent into Bass Strait which impacts heavily on the bathing water quality at beaches affected. Local communities have been fighting for years to improve effluent management practices among industries in the region and are only now beginning to make some headway.

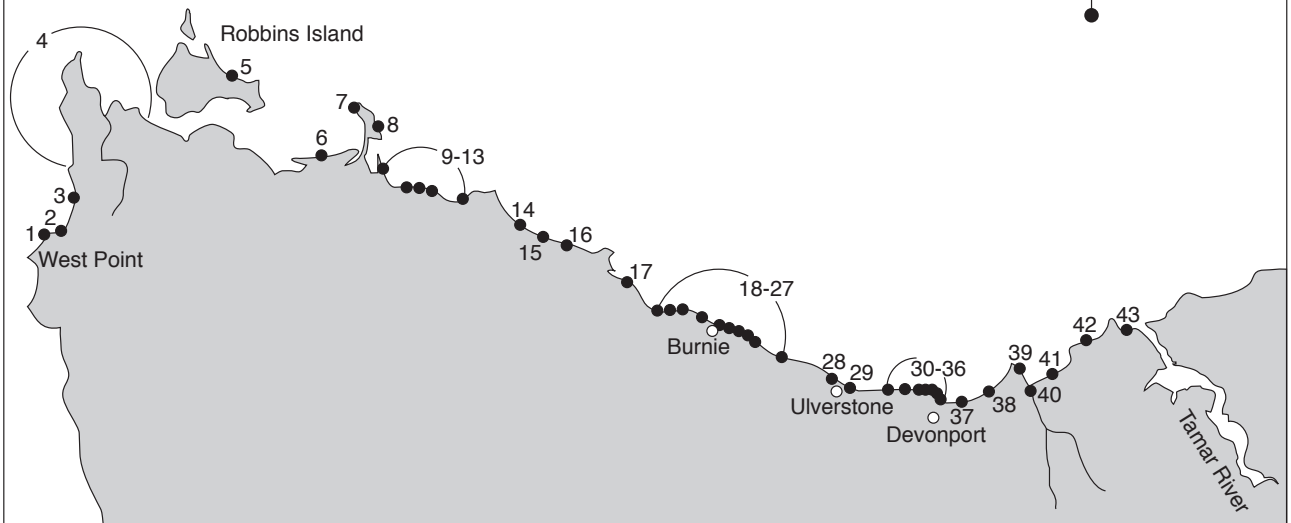
••• 1/2 moderately populated in parts: moderate impacts in parts

Trial Harbour to Tamar River and King Island



King Island
1. Porky Beach
2. Yellow Rock Beach
3. White Beach
4. Martha Lavinia Beach
5. Nine Mile Beach
6. Fraser Beach
7. City of Melbourne Bay
8. Broken Arm Beach
9. Colliers Beach
10. British Admiral Beach





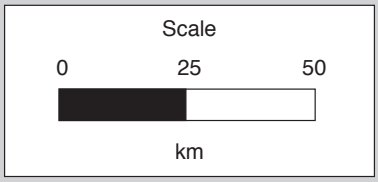
Sandy Cape

Hardwicke Bay

Trial Harbour

Macquarie Harbour

1. Netty Bay (Slaves Bay)
2. South Beach (Mount Cameron)
3. North Beach (Mount Cameron)
4. Dodgers Point to Robbins Passage
5. Robbins Island
6. Perkins Bay
7. North Point (Stanley)
8. Godfreys Beach (Stanley)
9. Pegs Beach
10. Brickmakers Beach
11. Crayfish Creek Beach
12. Edgekombe Beach
13. Rocky Cape Beach
14. Anniversary Bay
15. Sisters Beach
16. Boat Harbour
17. East Wynyard Beach
18. Somerset Beach
19. Ocean Vista Beach
20. Cooee Beach
21. West Beach (Burnie)
22. South Beach (Burnie)
23. Heybridge Beach
24. Midway Beach
25. Sulphur Creek Beach
26. Johnsons Beach
27. Penguin Beach
28. West Beach (Ulverstone)
29. Ulverstone Beach
30. Turners Beach
31. Lilico Beach
32. Coles Beach
33. Back Beach (Devonport)
34. Robos Point
35. Bluff Beach
36. East Devonport Beach
37. Pardoe Beach
38. Northdown Beach
39. Hawley Beach
40. Port Sorell Beach
41. Bakers Beach
42. Badgers Head Beach
43. Greens Beach



King Island

Length of Coastline: 120km (approximate estimate)

Number of Surveys: 10

Coverage: Reasonable

King Island is situated approximately 257 kilometres north-west of Devonport and supports a resident population of approximately 2500. The economic mainstays are grazing, fishing, and mining with tourism becoming increasingly important. The island is surrounded by many reef shelted coves and sandy beaches.

Network members returned 10 surveys: all for individual beaches. Lengths of beach areas surveyed range from 200 metres to 15 kilometres.

According to network members, all of the beaches have dunes. Dunal areas are generally small in size averaging one to 20 metres in height and from two to 25 metres in width.

Most beach areas are behind farming property and require the permission of land owners and four wheel drives. To address this problem the Shire Council is embarking on a long term strategy to provide access at selected beaches, purchasing property where necessary. For example, as part of its 1994/95 capital works program, the Shire Council purchased a strip of land for the provision of an access road to Porky Beach.

Network members identified two sewerage outfalls discharging in the vicinity of beach areas surveyed. These are located at Currie Harbour and Grassy Bay and discharge primary treated effluent to the ocean.

According to network members beach areas are generally free of impacts and litter is kept under control by local communities who keenly support clean-up programs like Clean Up Australia Day.

•••• sparsely populated: low impacts

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5. Appendices

5.1 - Network Members

List of volunteers who participated in the SOS95 Beach survey:

Jim Aherne
Tom Alletson
George Andrews
Chris Aram
Lynne Arnold
Paul Atherton
Bob Arthur
Robert Arthur
Frank Asken
Geoff Atkins
Ken Atkins
Maureen Baker
Mary Alice Ballantine
Anna Barnes
Libby Barrios
Phil Bastian
Lyall Bates
Bruce Beavis
Rodney Bell
Louise Bergin
Robert Bogumil
Lynn Bolto
Trevor Bolto
Kevin Bonner
Tom Bott
Melissa Bradbury
Cheryl Bradley
Steve Bradley
Glenda Brokling
George Brow
Snow Bryant
Karen Bulbeck
Haydon Burford
Graeme Burgan
Kathy Burgess
John Butler
Pam Butt
Norm Byrnes
Len Cameron
Paul Carey
William Carr
Brian John Carson
Brett Caruthers
Steve Cartwright
Irene Champion
David Charles
Dorothy Chilcott
Heather Ciesiolka
Bryan Clark
Steve Clark
Bart Clekam
Ian Coghlan
Sharon Cole
Brian Connolly
Christine Cox
Alice Crabtree
John Craike
Lara Crew
Phil Critchlow
Allan Cross
Sandra Cross
Julie Cumming
J. Curran
Mary Cusack
Steve Daros
Terry Deniss
Antz Dent
Paul Dimmick
David Dockery
Peter Dodge
Chris Done
Paul Douglas
Ross Dreise
Nona Druett
David Duncan
Kevin Dunne
Chris Durbidge
Marrisa Dyer
Kim Eastman
Andrew (Nobby) Edwards
Robert Ellis
Fiona Ensley
Nic Faulkner
Andrew Fay
John Fischer
John Fisher
Mark Fisher
Pat Flood
John Ford
Melanie Fontain and family
Mark Fordham
John Foss
Brian Fowler
Rick France
Rachel French
Andy Frost
Jake Frost
Ashly Gale
Jody A. Gates
Jan Gay
Malcolm Gay
Jane Gee
Mal Gibson
Mary Gloyne
David Goggin
Bruce Gordon
Damian Goss
Frank Gow
Andrew Green
Kim Green
Murray Greenaway
Barry Greer
Hugh Greer
Ross Grimley
Tom Grosskopf
Chris Groves
John Haley
Ryan Haley
Daryl Hampson
Mark Hanigan
Paula Hanigan
Brian Hann
Dallas Hansen
Michele Hargrove
Ross Harrison
Tony Harrison
Brenda Harvey
Simon Hawkey
Steve Hayes
Chris Hewgill
Ken Heyne
Byron Hill
Rod Hillman
Eric Hoare
Betty Hobbs
Sara Hollice
Greg Hossack
Priscilla Hubbard
Eddie Hughes
Brian Hulland
Ian Hurford
Cecilia Hurley
Danelle Hutchinson
Steve Hutchinson
Chris Jacobs
Sylvia Jacobs
David James
Larry James
Peter Jameison
Mary Jenkins
Alison Jones
Henry Jones
Rick Jones
Rob Kathner
Myles Keeshan
Robert Kellermier
Simon Kelly
Gary Kendell
Ryan Kennedy
Ian Kerr
Ray Kingwill
Adam (Stix) Lakeman
Kylie Lambkin
Robert Larkins
Shaun Latham
Barry Law
Mark Lawson
Jenny Lewis
Anna Lightowler
Jenny Linney
John Linney

Bill Lowe
Tim Lynch
Matthew Mackay
Ellie Mackenzie
Lisa Mackenzie
Lydia Mackenzie
Sally Marshall
Paul Martinovich
Bernie Masters
Paul May
John McCabe
Chris McCann
Charlie McColl
Nigel McKee
David McPherson
Hilary Merryfield
Theo Merryfield
Paul Minards
Peter Mitchell
Tim Mitchell
Bruce Montgomery
Tom Moren
Damian Moroney
Betty Morris
Bill Morris
Alison Morris
Peter Morris
Don Mount
Kay Muggleton
Richard Muggleton
Chris Muller
Janie Murry
David Nalder
Dave Napper
Jane Nelson
Mark Nelson
Brian Nicholson
Dave Nicholson
Berlynda K. Noble
Hilton Noble
Barbary O'Brien
Don Osbourne
Lyn Overton
Terry Owers
Gordon Paine
George Park
Priscilla Park
Ailsa Parker
Maria Patrick
Bevan Patterson
Mike Paxman
Michael Paxton
Kathy Peck
Karla Peek
R.W. Pemberton
Mike Pepperday
Tony Pervis
Trina Phillips
Andrew Pitt
Nick Player
Graham Pollard
David Pratt
Stephen Pritchard
Sheralee Randall
Ossie Rea
Sean Rea
Scott Reader
Graeme Regan
Doug Reilly
G. Reynolds
Mary Ritchie
Jack Robbins
Barbara Roberts
Karen Robinson
Doug Rogers
Todd Rohl
Tony Rooney
Hannah Ross
Bill Russell
Matt Ryan
Wayne Ryan
Glenn Saltmarsh
Preston Sands
Ron Sandercock
Karen Schmidt
Trish Schow
Joseph Scoble
Matthew Scoble
Sharon Scoble
Jim Scott
Paul Seager
Maureen Sears
Ted Sears
Charlie Seddon
Jamie Seeleither
Brian Semmens
Craig Shankland
Jessie Shankland
Barry Sharmen
Ed Sharrock
Phil Shaw
Joy Shearer
Ron Shepherd
Allan Shields
Leif Shipway
Mark Short
Todd Silvester
Keith Simmonds
Michelle Sinclair
Brian Singleton
Simon Skelton
Bob Slight
Steve Smallwood
Elizabeth Smith
Jeremy Smith
John Smith
Stephen Smith
Ruth Southon
John Spaans
Mark Spooner
Fran Stanley
Barry Sterling
Kyrn Stevens
Claire Stewart
Jim Stewart
Steven Storer
Pancho Stringer
David Sutton
Ian Sutton
Maureen Tarrant
Terry Tarrant
Philip Tattersall
Dadee Taylor
Norm Taylor
Alan Thomas
Jeff Thomas
Jenny Thomas
Richard Thomas
Shayne Thompson
Margaret Thorsborne
Colin Thyer
Klaus Tiedemann
Christopher Tola
Bryn Troath
Malcolm Turner
Tony Vazeley
Steve Vellacott
Ron Vidler
Steve Voros
Glenn Wainwrights
Julia Walkden
Brandon Walker
John Walker
Keith Walker
Ian Ward
Giz Watson
Russell Watson
John Webber
Paul Ween
Sally Wells
Jackie Whetham
Andrew Whiley
Dean Whitson
Geoff Wickenton
Carol Williams
Marty Williams
Sandi Wills
Bob Winn
Jacki Wirth
Paul Worboys
Albert Zepf

5.2 - Organisations

List of organisations who assisted Surfrider Foundation with the SOS95 Beach Survey.

- Albany Local Environmental Action Forum
- Angourie Dune Care
- Ardrossan Area School
- Arno Bay Land Care Group
- Australian Conservation Foundation
- Balnarring Foreshore Reserves Committee
- Bega Environment Network
- Binningup Community Association
- Brou Lake/Potato Point Dune Care
- Broulee Dune Care
- Bugga Bugga Creek Land Care Group
- Bunbury Naturalists Club
- Busselton Naturalists Club
- Community for Coastal & Cassowary Conservation Inc.
- Cairns & Far North Environment Centre
- Capricorn Conservation Council
- Carnarvon Shire
- Ceduna District Council
- Chain of Lagoons Land Care Group
- Chinaman Creek/Winninowie Conservation Park
- Cockburn Water Authority
- District Council of Warooka & Yorketown
- Dixson Land Care
- Dorset Waterwatch & Clean Water Group
- Elliston Jetty Caravan Park
- Erikangi Aboriginal Community
- Eurobodalla Dune Care
- Eurobodalla Shire Council
- Fine Cut Surfboards
- Flinders Council
- Friends of Burrup Peninsula & the Dampier Archipelago
- Friends of Port Kennedy
- Friends of Shoalwater Marine Park
- Gascoyne Conservation Council
- Great Barrier Reef Marine Park Authority
- Grey Rocks Dune Care
- Hamilton Island Environment Committee
- Henley and Grange Dune Care Group
- Island Voice Association Inc.
- Jervis Bay Boardriders
- King Island Council
- Kingfisher Bay Resort
- Kuku-Yalandgi Aboriginal Community
- Launceston Environment Centre
- Lower Timber Creek Land Care Group
- Mackay Conservation Group
- Maitland Area School
- Marine & Coastal Community Network
- Marion Bay Store
- Middleton Town & Foreshore Improvement Association
- Minbrie Land Care Group
- Minlaton District School
- Moonta Area School
- Mystery Bay/Narooma Dune Care
- Nanga Bay Resort
- Ningaloo Preservation Association
- North Australian Conservation Service
- North QLD Conservation Council
- NSW National Parks and Wildlife Service
- Ocean Air Sailboards
- Offshore Boardriders Club (Rottnest Island)
- Penneshaw Land Care Group
- Pilbarra Environment Group
- Point Lookout Surfriders Club Inc.
- Port Adelaide Residents Environment Group
- Port Broughton Area School
- Port Hedland Local Environment Affinity Force
- QLD National Parks and Wildlife Service
- Ravensthorpe Shire
- Reef Biosearch P/L
- Rusty Sea Dog Surfshop
- SA National Parks and Wildlife Service
- Serious Surf Stuff
- Shark Bay Salt Joint Venture
- Shire of Shark Bay
- Shoalhaven City Council
- South Coast Dune Care Group - SA
- South Head & Congo Dune Care
- Spencer Gulf Environmental Alliance
- Spring Bay Land Care Group
- Stokes Bay Land Care Group
- TAS Centre for Sustainable Agriculture
- TAS National Parks and Wildlife Service
- TAS North West Board Riders Association
- The Marble Range Soil Conservation Group
- Tomakin Dune Care
- Torndirrap National Park
- Tumby Bay Land Care Group
- Upper Cygnet River Land Care Group
- Valla Environment Group
- VIC National Parks and Wildlife Service
- Vivonne Bay Progress Association
- WA Coastal Waters Alliance Inc.
- WA Department of Agriculture
- WA National Park and Wildlife Service
- WA Fisheries Department
- WA Greens
- Yahoi! Surf School
- Yarrabah Community Ranger Service

5.3 - SOS95 Beach Questionnaire

How to complete the SOS95 Beach Questionnaire

The following notes are designed to assist you in the completion of the SOS95 Beach Questionnaire. If you have any problems or queries regarding the interpretation of a question for a particular beach in your region then simply contact Surfrider Foundation. Good luck and once again thanks for your assistance.

Some general comments first...

1. If you find you need further information about a beach or it's pollution sources then simply ring the local council and ask to speak to the Manager in charge of Beaches or the Environment Department depending on the nature of the enquiry. Information concerning Sewerage Treatment Plants is available by contacting the authority in charge of the treatment plant.

2. Indicate your information source when required to do so in the questionnaire. Personal observation/ experience is valid in most circumstances, however, please do not speculate. If you are unsure about a particular pollution source or land classification then simply contact the relevant authority for the information you require.

3. Remember to mark the location of each beach on a regional map. This is necessary to avoid confusion at our end. I suggest that you use a numbering system working north to south or east to west as the case may be.

Notes relating to each question...

Q1. About the beach itself:

If the beach is an urban beach then the council may deposit sand on the beach as part of an ongoing beach replenishment program. In addition, sand on the beach may be regularly cleaned/graded by council using machinery. If you suspect that either applies but are not quite sure, then check with the beach inspector and/ or the local council.

Q2. Public access:

Tick the box that best summarises public access to the beach concerned. If access is restricted in part or in full, or, alternatively, if an entry fee is payable then please provide details.

Q3. Classification of land directly opposite the beach:

If the beach is long there may be several different land tenures along its length. Simply tick all of those that apply. If there is a land reserve or public park opposite the beach then please give details as to the type of reserve, its name, and the size of area covered by the reserve. Information concerning land tenure is available by contacting the local council.

Q4. Beaches with a dunal buffer zone:

Estimate the approximate height and width of the dunes and then tick the box(es) that best summarise the dune vegetation and dune management. For information conerning non-native plant species contact the local council and ask for the Manager in charge of Beaches.

Q5. Beaches without a dunal buffer zone:

Simply indicate which category best applies. If the beach backs onto a non-dunal land mass or if the dune has been removed by sand extraction then please provide the details.

Q6. Urban development opposite the beach:

If the beach has urban development anywhere along its length then simply indicate the distance from the high tide mark to the edge of the development and tick the appropriate box(es) concerning the nature of this development.

Q7. Nature of mining operation:

If the beach is currently being mined then please provide details. These should include the nature of the mining operation and size of area affected.

Q8. Sewerage outfalls:

Indicate the location of the nearest sewerage outfall and estimate how far this outfall is from the centre of the beach you are surveying. It is important you provide this information for every beach so that we can estimate the percentage of Australian beaches that are within 250m, 1km, and 5km of a sewerage outfall.

If the outfall is an extended (deep water) ocean outfall then please indicate by telling us its location and how far out to sea it has been extended.

In some cases the sewerage treatment plant disperses effluent not through an outfall, but into sand dunes. Such systems are called *sand exfiltration systems* and can still pose a threat to beach users and the environment. If you have any sand exfiltration systems in your region then please include these in your survey.

Also include sewerage outfalls that discharge into adjacent rivers, creeks or artificial wetlands and indicate the distance from the point of discharge to the coast.

Also include private outfalls. By private we mean those belonging to industries that are situated on the coast. While most industries simple discharge into the public sewerage system, there are still many that have their own private outfall, some of which pose a significant threat to the marine environment. If you suspect that an industry has its own private outfall then check with the industry itself. If they do not co-operate then let me know via the questionnaire and we will access the information from the relevent State Government Authority.

Information concerning the level of sewerage treatment and percent of effluent re-use is available by contacting the authority in charge of the sewerage treatment plant and/or by contacting the local council.

Finally, please mark the location of each outfall on your regional map. This will help us nail the exact location of every sewerage outfall on the Australian coastline.

Q9. Stormwater pipes:

Indicate the number of stormwater pipes that discharge to either the beach or its lagoon and indicate the nature of litter evident at the entrance of these during your survey. If you cannot see any pipes but suspect they may be buried beneath the sand, then simply check with the lifeguards and/or local council. Bear in mind that litter may only be evident if there has been a recent storm event and the pipe outlet is above ground.

Note that stormwater pipes discharging into adjacent rivers or creeks is covered by Q11.

Q10. Litter on the beach and its surrounds:

Indicate the type of litter you find on the beach and its surrounds during your survey. Also indicate which groups, if any, regularly pick up litter at the beach.

Q11. Pollution via rivers, creeks, and estuaries:

Without water quality testing it is impossible to know which pollution sources entering a river or creek actually find there way to, or impact on, the near shore ocean environment of an adjacent beach. However, indicate the nature of known pollution sources entering rivers and creeks adjacent to the beach you are surveying. Do not speculate regarding possible pollution sources. If you suspect the water course may be polluted then check with other sources. However, be wary of local authorities who may downplay a particular pollution source. You may find that you need to consult an independent source for the information you require.

Q12. Recreational groups known to regularly use this beach:

Simply indicate which recreational groups regularly use the beach. If you are not too familiar with the beach being surveyed then check with a local.

Q13. Development proposals:

If you know of any development proposals affecting the beach being surveyed then please provide details.

Q14. List problems and/or pollution sources that need highlighting:

This is an opportunity to highlight any particular problems concerning the beach you have just surveyed. If possible provide photos and we may use these in the report.

5.3 - SOS95 Beach Questionnaire (cont'd)

Beach Name: _____ Location: _____

Your Name: _____ Telephone No: _____

Tick/fill blanks as appropriate and indicate clearly the location of this beach on a regional map.

1. **About the beach itself:**
   Approximate length (km):
   Number of artificial groynes:
   How often is sand deposited on the beach by council using a dredge or truck:
   Is sand graded/cleaned regularly by council?
   __ yes
   __ no
   __ don't know
   (information source)
2. **Public access:**
   __ unrestricted public access
   __ entry fee to public *(give details)*
   __ public access restricted in part only *(give details)*
   __ access closed to the public *(give details)*
   Details:
   (information source)
3. **Classification of land directly opposite the beach** (tick all those that apply):
   __ urban __ crown
   __ private *(give details)* __ reserve *(give details)*
   Details:
   (information source)
4. **a. Beaches with a dunal buffer zone:**
   Max. height of dune above sea level (m):
   Max. width (m):
   b. Vegetation on dunes (tick all those that apply):
   __ grass __ shrubs __ trees
   Are there any non-native plant species colonising these dunes?
   __ yes
   __ no
   __ don't know
   List the names of the non-native species and indicate the extent of their coverage compared to the natives:
   (information source)

c. Dune management:

Is vegetation fenced off from the beach itself?

__ yes

__ no

__ in part

Is vegetation fenced off from 4wd access tracks?

__ yes

__ no

__ n/a

Is vegetation fenced off from walkways/access paths?

__ yes

__ no

__ n/a

Do dune-care groups do repair work on this beach?

__ yes

__ no

__ don't know

Do council workers do repair work on this beach?

__ yes

__ no

__ don't know

5. Beaches without a dunal buffer zone (indicate which classification holds true):

__ beach is located at bottom of cliff face __ beach is located at end of rocky outcrop

__ beach is located inside bay or estuary __ beach backs onto non-dunal land mass *(give details)*

__ beach has has its dune removed by sand extraction and/or urban development *(give details)*

Details:

(information source)

6 a. Distance from high tide mark to urban development opposite the beach:

__ n/a __ less than 50m __ 50m to 100m

__ 100m to 250m __ greater than 250m

b. Nature of development within 250m of high tide mark *:*

__ caravan park/camping ground

__ medium density living

__ high density living

__ carpark

__ boardwalk

__ road

__ houses

__ shops

__ resort

__ other

7. Nature of mining operation:

__ n/a

__ currently being mined *(give details)*

Details:

(information source)

8 a. Location of nearest sewerage outfall:

b. Distance from outfall to centre of beach:

__ 0 to 250m
__ 250m - 1km
__ 1km - 5km
__ >5km

c. Level of sewage treatment before discharge *(indicate those that apply):*

__ screened only __ UV
__ primary __ nutrient removal
__ secondary __ tertiary
__ chlorination

d. What percentage of effluent is re-used under normal operating circumstances:

e. Name and telephone number of authority operating this sewerage outfall:

9 a. Stormwater pipes (please indicate the number of pipes):

__ n/a
__ onto beach
__ into lagoon

b. Nature of litter evident at the entrance of the stormwater pipe(s) during survey:

__ no litter evident __ cigarette butts __ glass bottles
__ cans __ plastic/PET bottles __ styrofoam packaging
__ plastic bags __ food wrappers __ syringes
__ condoms __ other

10 a. Nature of litter evident on beach and/or dunes:

__ no litter evident __ cigarette butts __ glass bottles
__ cans __ plastic/PET bottles __ styrofoam packaging
__ plastic bags __ food wrappers __ syringes
__ condoms __ other

b. Nature of litter evident in car-park and/or access paths:

__ no litter evident __ cigarette butts __ glass bottles
__ cans __ plastic/PET bottles __ styrofoam packaging
__ plastic bags __ food wrappers __ syringes
__ condoms __ other

c. Are beach and surrounds regularly cleaned of litter:

__ no __ yes, by council workers __ yes, by community groups
__ yes, by individuals __ don't know

d. Location of bins:

__ n/a __ on beach itself
__ carpark __ access paths

11. Pollution via rivers, creeks and/or estuaries:

List and provide details of known sources of pollution reaching this beach via a river, creek, or estuary *(including harbours)*

CODE: sewerage outfall -A urban runoff -B agricultural runoff -C
industrial outfall -D litter/debris -E other -F

Name of river, creek, or estuary Pollution sources (list as per code and give details)

(information source)

12. Recreational groups known to regularly use this beach:

__ sightseer/tourist in car park/lookout
__ sunbakers/picnickers on the dry beach area
__ beachcombers/joggers in swash zone
__ bathers in swash and inner surf zone
__ surfers in breaker zone
__ IRBs, boats beyond breakers
__ skis, kayaks, windsurfers in breakers and beyond
__ 4wd on beach
__ other groups

(information source)

13. Development proposals affecting this beach:

__ n/a __ land rezoning __ sewerage outfall
__ housing development __ resort __ marina/canal development
__ golf course __ other

Details (be specific and indicate the stage the proposal is at):

(information source)

14. List problems and/or pollution sources concerning this beach that need highlighting:

Questionnaire ends

5.4 - Sewerage outfalls

List of sewerage outfalls identified by network members as discharging in the vicinity of beach areas surveyed.

Outfall Location	Discharge to		Effluent Standard	Capacity	Re-use
	Ocean	Estuary		(ML/Day)	(per cent)
NORTHERN TERRITORY					
Larrakeyah	√		primary with chlorination	0.46	
Ludmilla	√		primary	5.4	
QUEENSLAND					
Mossman		√	secondary with chlorination	7.4	65
Cairns (Northern Plant)		√	secondary with chlorination	14	
Cairns (Southern Plant)		√	secondary	16	
Townsville (Sandfly Creek)		√	secondary	0.35	35
Bowen (Dalrymple Point)	√		secondary	1.61	20
Pioneer Bay North	√		secondary with chlorination	2.3	
Pioneer Bay South	√		secondary with chlorination	1.7	
Proserpine (Proserpine River)		√	secondary	1.7	
Mackay (Pioneer River)		√	secondary	12.5	
Sarina (Reliance Creek)		√	secondary	2	
Yeppoon (Wreck Point)	√		secondary	3.5	20
Rockhampton (3 PLants)		√	secondary	1.35	
Gladstone (No. 1 Plant)		√	secondary	4.6	
Gladstone (No. 2 Plant)		√	secondary	0.92	
Tannum Sands		√	tertiary	1.8	
Bundaberg (Burnett River)		√	secondary with chlorination	6.9	10
Noosaville (Burgess Creek)		√	secondary with chlorination	2.76	
Maroochy (Eudlo Creek)		√	tertiary	1	
Kawana	√		secondary	9	2
Caloundra	√		secondary with nitrogen removal	6.5	
Redcliffe (Hayes Inlet)		√	secondary	13	
Sandgate (Crabbage Tree Creek)		√	secondary	no details	
Luggage Point (Brisbane River)		√	secondary	180	7
Wynnum (Crab Creek)		√	secondary	8.5	2
Victoria Point (Eprapah Creek)		√	secondary	2	
Coombabah (Broadwater)		√	secondary with nutrient removal	80	
Merrimac (Boobegan Creek)		√	secondary	16.1	
Elanora (Tallabudgera Creek)		√	secondary	23	
Hamilton Island Resort	√		tertiary	no details	
South Keppel Island (Putney Point)	√		secondary	no details	
Fraser Island (Kingfisher Bay)	√		secondary with chlorination	0.15	
Bribie Island (South Point)	√		secondary	1.8	

Outfall Location	Discharge to		Effluent Standard	Capacity	Re-use
	Ocean	Estuary		(ML/Day)	(per cent)
NEW SOUTH WALES					
Tweed Heads		√	tertiary	2	
Ocean Shores		√	tertiary	0.46	
Brunswick Heads		√	tertiary	0.6	
Byron Bay (West Plant)		√	tertiary	no details	
Byron Bay (East Plant)		√	tertiary	no details	
Skenners Head	√		secondary	no details	
Woolgoolga		√	secondary with chlorination	no details	
Coffs Harbour (Corrumbirra Point)	√		secondary with chlorination	9.7	
Sawtell (Boambee Head)	√		secondary with chlorination	4.14	
Crescent Head (Big Nobby)	√		primary	4	
Port Macquarie		√	tertiary	10	
Camden Head	√		secondary with chlorination	1.2	
Harrington		√	tertiary	0.4	
Forster/Tuncurry (Jainey's Corner)	√		secondary	4.5	
Port Stephens (Boulder Bay)	√		secondary	3.5	
Stockton	√		secondary	1.2	
Newcastle (Burwood Beach)	√		secondary	40	
Belmont	√		secondary	13	
Swansea (Little Beach)	√		screened only	2	
Nora Head	√		secondary	28	
The Entrance (Wonga Point)	√		secondary	35	
Avoca (Winney Bay)	√		tertiary	30	
Umina Beach (Point Frederick)	√		tertiary	no details	
Warriewood (Turrimetta Head)	√		secondary	25	
Sydney (North Head)	√		secondary with nutrient removal	390	
Sydney (Ben Buckler)	√		screened only	165	
Sydney (Long Bay)	√		screened only	490	
Cronulla (Potter Point)	√		primary	50	
Bellambi Point	√		tertiary	20	
Wollongong (Corniston Beach)	√		secondary	30	
Port Kembla (Red Point)	√		primary	15	
Shell Harbour (Barrack Point)	√		secondary	11	
Kiama (Cathedral Rocks)	√		primary	18	
Jervis Bay (Plantation Point)	√		tertiary	8	
Ulladulla (Racecourse Beach)	√		secondary	2.2	
Batemans Bay (Surf Beach))	√		tertiary	3.5	up to 90
Tomakin	√		tertiary	1.9	
Moruya		√	tertiary	1.6	up to 90
Kianga	√		tertiary	2.8	
Bermagui	√		tertiary	0.5	up to 90
Merimbula	√		tertiary	4.8	up to 90
Eden	√		tertiary	1.85	50
Norfolk Island (Headstone Point)	√		secondary	no details	

Outfall Location	Discharge to		Effluent Standard	Capacity	Re-use
	Ocean	Estuary		(ML/Day)	(per cent)
VICTORIA					
Bairnsdale		√	secondary	6.9	
Delray Beach	√		secondary	40	
Port Welshpool	√		secondary	0.2	
Toora	√		secondary	0.7	
Foster	√		secondary	0.5	
Venus Bay	√		primary	1.2	
Eagles Nest Beach			emergancy outfall only		
Wonthaggi (Baxter's Beach)	√		secondary	2.7	5
Melbourne (Boag's Rocks)	√		secondary	470	
Melbourne (Black Rock)	√		millscreen only	55	
Anglesea	√		secondary	0.8	
Lorne	√		primary	0.4	
Appollo Bay	√		primary	0.5	
Warrnambool (Thunder Point)	√		screened only	7.5	
Port Fairy	√		screened only	1	
Portland (Bald Hill)	√		screened only	3	
Cowes (Pyramid Rock)	√		secondary	1.2	
SOUTH AUSTRALIA					
Finger Point	√		secondary with chlorination	9.4	
Victor Harbour		√	secondary with chlorination	1.84	10
Adelaide (Christie's Beach)	√		tertiary	24	10
Adelaide (Glenelg)	√		secondary with chlorination	58	
Port Adelaide		√	secondary	35	
Bolivar	√		secondary	133	
Moonta Bay	√		screened only	no details	
Port Pirie	√		primary	4.1	
Port Augusta	√		primary	3.2	
Port Lincoln	√		secondary	4.6	
Baird's Bay	√		secondary	no details	
Streaky Bay			no details		
WESTERN AUSTRALIA					
Bunbury (No. 1 Plant)	√		outfall closed in 1996	-	
Cape Peron	√		primary	90	
Perth (Swanbourne Beach)	√		secondary	50	
Perth (Ocean Reef)	√		secondary	130	
Cocos Islands (Quarantine Station)	√		no details	intermittent	
Broome (Jetty Toilets)	√		primary	intermittent	

Outfall Location	Discharge to		Effluent Standard	Capacity	Re-use
	Ocean	Estuary		(ML/Day)	(per cent)
TASMANIA					
Flinders Island (Hospital WWTP)	√		tertiary	no details	
Georgetown		√	secondary	2.2	
Bridport Ocean	√		secondary	0.7	
St Helens	√		secondary	0.35	
Triabunna	√		secondary	0.2	
Orford (Quarry Point)	√		primary	0.5	
Port Arthur	√		secondary	0.2	
Sorell	√		primary	0.2	
Hobart (Midway Point)	√		secondary	0.2	
Hobart (Rosny Point)		√	secondary with chlorination	7.5	
Hobart (Selfs Point)		√	secondary	6.2	
Hobart (Sandy Bay)		√	screened only	2.7	
Hobart (Blackman's Bay)		√	secondary	3.2	
Snug (Peggy's Beach)	√		secondary	0.25	
Dover	√		secondary	0.1	
Southport	√		secondary	no details	
Strahan		√	secondary	0.24	
Smithton (Pelican Point)		√	secondary	5	
Stanley		√	secondary	0.23	
East Wynyard	√		secondary	3	
Somerset	√		secondary	1.2	
Burnie (Cooee Point)	√		secondary	2	
Burnie (Round Hill)	√		tertiary	6	
Penguin (Dial Point)	√		secondary	0.7	
Ulverstone (Picnic Point)	√		secondary	7.5	
Ulverstone (Turner's Beach)		√	secondary	0.4	
Devonport (Pardoe Beach)	√		primary	14.7	
Port Sorell (Edies Point)		√	secondary	1.7	
King Island (Grassy Bay)	√		primary	no details	
King Island (Currie Harbour)	√		primary	0.24	

5.5 - Pollution sources via catchment

List of water courses identified by network members as being a source of beach pollution via catchment.

Name of source	Sewerage outfall	Industrial outfall	Urban runoff	Agricultural runoff	Septic runoff	Litter and debris	Other types	Details/ Comments
NORTHERN TERRITORY								
McArthur River				√				Sediment runoff from grazing country
QUEENSLAND								
Daintree River				√		√		Erosion on cattle property
Lagoon				√		√		
Barron River				√	√	√		
Cape Grafton to Slade Point								
NT/QLD Border to Cape Grafton								
Turtle Bay Creek						√		
Kings Beach Creek						√		
Djildji Creek						√		Usually during heavy rain
Wuungu Creek						√		
Palmers Creek								
Maria Creek; Muff Creek				√				
Wyllie Creek			√	√				
Mackness Creek			√	√				
small creeks (North Mission Beach)			√	√				Water considered unsafe by locals
Wongaling Creek			√	√				
Wheatleys Creek			√	√				
Hull River				√		√		
Victoria Creek				√				
Cassowary Creek							√	Prawn farm
Douglas Creek	√							
Fern Gully Creek			√			√		
Blind Creek		√						Nickel Refinery (Yabulu)
Allans Creek		√						Nickel Refinery (Yabulu)
Bohle River			√	√		√		
Ross Creek		√	√	√		√		Port facility
Doughty's Creek		√					√	Coking works drain to creek, (coal dust)
Cannonvale Creek	√	√	√					
Airlie Creek			√			√		Occasional raw sewage overflow
Proserpine River	√			√		√		
Repulse Creek						√		
Slade Point to Baffle Creek								
McCready's Creek			√					
Mackay Harbour							√	Spillage and other sources from port operations
Fitzroy River	√	√	√	√		√		Landfill leachate; debris
Ross Creek		√	√	√		√		
Williamson Creek	√		√					
Causeway Lake			√	√		√		
small creek (Fishermans Beach)			√			√		
Auckland Creek						√	√	Leachate from Gladstone tip; fly ash
Round Hill Creek			√	√	√	√		
Agnes Creek			√			√	√	Grey water discharge from caravan park
Baffle Creek to Caloundra								
Littabella Creek							√	Outfall from prawn farm
Kolan River				√		√		
Moore Park Creek				√		√		
Skyringville Creek		√		√				
Fairymead Creek		√		√				
Sandy Camp Creek		√		√				
Burnett River	√	√	√	√	√	√	√	
Moneyis Creek	√		√	√		√	√	
Elliot River	√		√	√		√	√	Includes plastic mulch from farm operations
Burrum River	√		√	√	√	√		

Name of source	Sewerage outfall	Industrial outfall	Urban runoff	Agricultural runoff	Septic runoff	Litter and debris	Other types	Details/ Comments
Noosa River		√	√	√				
Kinkin Creek				√				
Burgess Creek	√		√		√			
Stumers Creek			√					
small creek (Yaroomba Beach)			√					
Maroochy River			√	√		√		
Mooloolah River			√			√		
Bunbubah Creek			√			√		
Tooway Creek			√			√		
Lamerough Creek							√	Canal development
Caloundra to QLD/NSW Border								
Newport Water/Scarbrough Harbour						√	√	Hydrocarbons
South Pine River		√	√	√		√		
Cabbage Tree Creek	√		√			√		
Deep Water Channel			√			√		
Serpentine Creek			√					
Brisbane River	√	√	√	√		√		
Wynnum Creek			√	√		√		
Tingalpa Creek			√	√		√		
Manly Boat Harbor								
Hillards Creek			√	√		√		
Raby Bay Canal Estate			√			√		
Moogurrapum Creek			√	√		√		
Nerang River and Broadwater	√		√			√	√	Recreational boats
Tallebudgerra Creek			√			√		
Tallabudgerra Creek to Currumbin Estuary			√			√		
Currumbin Estuary			√			√		
Flat Rock Creek			√			√		
small creek (Picnic Bay)			√		√			Untreated sewerage from septic system
Bribie Island								
small creek (Welsby Parade Beach)			√			√		
Canal			√			√		
small creek (Silvan Beach)			√			√		
Dux Creek			√			√		
Wright Creek			√			√		
NEW SOUTH WALES								
NSW/QLD Border to Clarence River								
Tweed River	√		√	√				
Cudgen Creek			√	√				
Hastings River	√		√	√			√	Includes sewerage overflow via Christies Creek
Mooball Creek			√	√				
Brunswick River	√	√	√	√		√		Three sewerage outfalls
Belongil Creek			√				√	West Byron WWTP
Tallows Creek	√							East Byron WWTP
Richmond River	√	√	√	√		√		
Evans River	√		√					
Jerusalem Creek							√	Bait bags; flotsam and jetsam
Clarence River			√	√		√		
Clarence River to Hastings River								
Lake Cakora			√		√			Ocassional runoff from septics
Arrawarra Creek			√					
Woolgoolga Lake			√	√				
Willis Creek	√	√	√	√				Woolgoola WWTP
Fiddamens Creek			√	√				
Moonee Creek				√				
Coffs Creek			√	√		√		
Boambee Creek			√	√		√		
Bellinger River	√		√	√				
Deep Creek	√		√	√		√		
Swimming Creek			√			√		
Beilby's Creek			√			√		

Name of source	Sewerage outfall	Industrial outfall	Urban runoff	Agricultural runoff	Septic runoff	Litter and debris	Other types	Details/ Comments
Macleay Creek				√				
Killick Creek			√	√			√	Flood water from tea tree swamp
Hastings River	√	√	√	√		√	√	Numerous sources including runoff from landfill
Hastings River to Port Stephens								
Cathie Creek			√			√		Debris includes bait bags, fish lin & plastic bags
Camden Haven River			√	√		√	√	Includes fuel from boats
Watson Taylors Lake							√	Runoff from Dunbogan Regional landfill
Crowdy Head Harbor							√	Anti-fouling paint, diesel & bilge-water
Manning River		√	√	√		√		
Racecourse Creek			√			√		
Saltwater Lagoon						√		
Wallis Lake			√			√		
Port Stephens					√	√		
Port Stephens to Broken Bay								
Fingal Creek			√			√		Stormwater from roads
Boat Harbour Creek			√			√		
Hunter River (Newcastle Harbour)	√	√	√	√		√		
Flaggy Creek	√		√			√		
Glenrock Lagoon	√		√			√		
Murdering Gulley	√		√			√		
small creeks (Dudley Beach)	√		√					
small creek (Redhead Beach)			√			√		
small creeks (Blacksmiths Beach)			√			√		
Swansea Channel (Lake Macquarie)			√		√	√	√	Recreational boats
South Creek			√			√		
Moonee Creek and Lagoon							√	
Tuggerah Lake			√			√		
Terrigal Lake	√		√			√		Recreational boats
Brisbane Water and Broken Bay	√	√	√	√		√	√	Recreational boats
Broken Bay to Bass Point								
Hawkesbury River			√	√		√		
Narrabeen Lagoon Estuary			√			√		
Dee Why Lagoon		√	√			√		
Greendale Creek		√	√			√		
Manly Lagoon		√	√			√		
Manly Lagoon		√	√			√		
Bundeena Creek			√		√			
Hargrave Creek			√		√			
Stoney Creek			√				√	Runoff from coal mine in adjacent valley
small creeks (Scarborough Beach)			√				√	Runoff from abandoned mine
Jacky Jones Creek			√					
Hick's Creek			√					
Flanagan's Creek			√					
Hewitt's Creek			√					
Stacky Creek			√					
Wharton's Creek			√					
Bellambi Creek			√				√	Runoff from coal mine
Bellambi Lake			√					
Towradgi Creek			√					
Port Kembla		√	√			√	√	Bilge from shipping
Bass Point to Batemans Bay								
Lake Illawarra entrance				√		√		
small creek (Mystics Beach)				√				
Minnamurra River			√			√		
Oarce Creek			√	√		√		
Crooked River			√	√				
Shoalhaven River			√	√		√		
Washerwomans Creek			√					
Inyadda Lagoon			√					
Manyana Lagoon			√		√			
Conjola Lake								

Name of source	Sewerage outfall	Industrial outfall	Urban runoff	Agricultural runoff	Septic runoff	Litter and debris	Other types	Details/ Comments
Blackwater Creek			√		√			
Mollymook Creek			√		√			
Beachside			√					
Millards Creek		√	√	√	√			
small creek (Rennies Beach)							√	Sewerage overflow from pumping station
Racecourse Creek		√	√	√				
Burrill Lake		√	√		√		√	Leachate from landfill
Tabourie Lake			√					
Termill Lake				√				
Willinga Creek				√			√	Forestry
Cormorant Creek			√					Dark brown staining on beach
Voyager Creek			√	√				
Kiola Lagoon			√		√	√		Septic runoff from caravan park
Merry Beach Lagoon					√	√		Septic runoff from caravan park
Durras Lakes			√	√	√			
Batemans Bay to NSW/VIC Border								
Clyde River (Batemans Bay)			√	√		√	√	Recreational boating
Short Beach Creek			√					
Candlagan Creek			√					
Congo Creek			√					
South Meringo Lagoon						√		
small creeks (Caravan Park Beach)			√			√		
Potato Creek			√			√		
small creek (Jemisons Beach)			√			√		
Brou Lake				√			√	Council tip
small creeks (Dalmeny Beach)			√					
Wagorga River			√	√				
Niarga Creek	√		√	√				
Corunna Lake				√				
small creek (Billys Beach)			√	√				
Tilba Creek				√				
Wallaga Lake			√	√				
Bermagui River		√	√	√		√		
Cottagee Creek				√				
Burrah River				√				Heavily affected by siltation
Bunga Lagoon				√				
Bega River	√		√	√				
Lord Howe Island								
Soldier's Creek				√				Grazing land (only small herd)
small creek (Old Settlement Beach)				√				Grazing land (cattle)
VICTORIA								
NSW/VIC border to Point Smythe								
rivers/creeks into the Corner Inlet				√				
shallow inlet				√				
Point Smythe to Barwon Heads								
Screw Creek			√	√				
Tarwin River				√				
Wreck Creek			√	√		√		
small creek (The Caves Beach)				√				
Powlett River		√	√	√				
Kilcunda Creek				√				
Western Port Bay		√	√	√		√		
Merricks Creek			√	√		√		
East Creek				√				
Stony Creek			√	√				
Double Creek				√				
Spring Creek				√				
Double Creek				√				
small creek (Kerrigreens Beach)				√				
Patterson River			√			√		
Mordialloc Creek			√			√		

Name of source	Sewerage outfall	Industrial outfall	Urban runoff	Agricultural runoff	Septic runoff	Litter and debris	Other types	Details/ Comments
Elwood Canal		√	√			√		
Swan Bay						√		
Barwon River		√	√	√		√		
Barwon Heads to Cape Otway								
Thompson Creek				√		√		
Deep Creek			√	√			√	Possible leachate from landfill
Spouts Creek			√					
Erskine River							√	Leachate from landfill
St George River						√		
Cumberland River						√		
Separation Creek				√				
Skenes Creek			√	√				
Milford Creek			√	√				
Barham River			√	√		√		
Cape Otway to VIC/SA border								
Campbell Creek			√	√				
Curdies River				√				Phosphates from upstream farms
small creeks (Terrys Beach)				√				Runoff reaches beach during heavy rain
Hopkins River	√		√	√				Sewerage outfall at Allansford
Merri River		√	√	√		√		
Kelly's Swamp				√				
Moyne River			√	√		√		
Yambuk Lake				√				
Surrey River		√		√				
Portland Harbor		√						Heavy shipping use
small creeks (Discovery Bay)				√				
Phillip Island								
Saltwater Creek			√				√	Occasional overflow from sewerage pump station
Old Water Reserve Creek			√					
small creek (Smiths Beach)			√	√			√	Occasional overflow from sewerage pump station
Wild Dog Creek				√				Algae blooms in creek runout onto beach
Swan Lake Outlet Creek					√	√		
Mandeville Road drain			√					
Green Lake Creek Outlet			√	√				
Boat Creek							√	Occasional overflow from sewerage pump station
SOUTH AUSTRALIA								
SA/VIC Border to Murray Mouth								
Lake George				√				
Butchers Gap drain				√				Artificial drain
Murray Mouth to Port Wakefield								
Murray River				√	√	√		
Middleton Creek			√	√		√		
small creek (Boorner Beach)			√	√				
Hindmarsh Estuary	√							
Inman River	√	√	√	√		√		High nutrient levels
Waitpinga Creek				√		√		
small creek (Normanville Beach)			√					
Bungalla Creek			√	√		√		
Miponga Creek			√	√				
Port Willunga Creek			√	√				
Onkaparinga River		√	√	√		√		
Christies Creek		√	√	√		√		
Patawalonga River	√	√	√	√	√	√		
Torrens River		√	√	√		√		
Port Wakefield	√	√	√			√	√	Leachate from garbage dumps; harbour uses
Port Wakefield to Point Bolingbroke								
Port Pirie River			√	√		√	√	Wash-down water from industry
Telowie Creek				√				Creek runs most years in winter
Baroota Creek			√	√		√		
small creeks (Upper Spencer Gulf)			√	√		√		Ephemeral creeks only during heavy rain
Spencer Gulf	√	√	√	√	√	√	√	Cooling water from power stations

Name of source	Sewerage outfall	Industrial outfall	Urban runoff	Agricultural runoff	Septic runoff	Litter and debris	Other types	Details/ Comments
Yeldulknie Creek				√				Only when flooding occurs in Cleve Hills
Driver River				√				
Dutton Creek				√				
Byrne Bay Creek				√				
Wadella Creek			√	√		√		
Coonta Creek			√	√		√		
Point Bolingbroke to SA/WA Border								
Kangaroo Island								
Cygnet River				√				
American River						√		Rubbish from vessels
Deep Creek						√		
Chapman River				√				
Wilson River				√				
South West River				√		√		
Western River				√				
Middle River	√			√		√		
Gum River	√			√				
WESTERN AUSTRALIA								
WA/SA border to Hopetoun								
Thomas River				√				
Bandy Creek						√		
Torradup River				√				
Hopetoun to Cape Leeuwin								
Culham Inlet				√				
Hammersley Inlet								
Nanarup Estuary				√		√		
Oyster Harbour			√	√				
Torbay Inlet				√				
Hay Rriver				√			√	Shire landfill
Parry Inlet				√				
Irwin Inlet				√				
Frankland River				√				
Cape Leeuwin to Becher Point								
Calgardup Creek					√			
Cowaramup Brook					√			
Quininup Brook					√			
Gunyulgup Brook					√			
Vasse River Diversion Drain				√	√	√		
Wonnerup Inlet				√				
Capel River				√				
Five Mile Brook				√				
Big Swamp Wildlife Reserve								
Leschenault Inlet		√		√			√	Bilge and other pollution sources from harbor use
Harvey Estuary				√				
Becher Point to Two Rocks Beach								
Two Rocks Beach to Steep Point								
Moore River				√				
Greenough River				√				Erosion in upper catchment
Chapman River				√				Silt load from upper catchment
Bowes River				√				
Murchison River								Dredging activity ; diesel fuel and oil; bilge
Steep Point to Cape Keraurdren								
Beadon Creek		√				√	√	Fishing boats and marine support for oil & gas
Boat Harbour			√			√	√	Discharge from boats using harbor
King Bay/Withnell Bay		√					√	Discharge from LNG plant and support vessels
South East Creek							√	Stormwater drain servicing industrial area
John's Creek		√				√		
Four Mile Creek						√		
TASMANIA								
Tamar River to Cape Lodi								
Tamar River	√	√	√	√		√		

Name of source	Sewerage outfall	Industrial outfall	Urban runoff	Agricultural runoff	Septic runoff	Litter and debris	Other types	Details/ Comments
Industrial Creek		√						Bell Buoy industrial site
Curries River				√				High algae growth
Tam O'Shanter Creek				√				
Piper's Creek			√	√				
Little Forrester River				√				
Brid River			√	√				
The Forrester Cut			√					
Four Mile Creek			√	√				
small creek (Golf Course Beach)			√	√		√		At southern end of beach
Cape Lodi to Marion Bay								
Coles Bay							√	Faecal matter from campers
Stony River				√		√		
Kelvedon Creek				√				
Old Man Creek						√		
Sandy Creek						√		
Lisdillon Lagoon				√		√		
Shea's Creek				√			√	Runoff from golf course and landfill
Marion Bay to South East Cape								
small creek (Carnarvon Bay Beach)				√	√			
Jenkins Creek				√	√			Public toilets discharge raw sewage into creek
Carlton River				√		√		
Pitt Water		√	√	√		√		
small creek (Lauderdale Beach)			√	√		√	√	Dog faeces
Derwent River	√	√	√	√	√	√	√	Oil and stormwater
Browns River			√	√		√	√	Illegal dumping
Snug River				√			√	Illegal dumping
Huon River	√			√				
Garden Island Creek	√			√	√	√		
South East Cape to Trial Harbour								
King River (Macquarie Harbour)		√		√				Tailings from the Mt. Lyell Copper Mine
Trial Harbour to Tamar River								
Emu River		√	√	√				Effluent from pulp mill
Blythe River		√						Tioxide pigment plant
Leven River			√	√				
Forth River	√		√	√				
Don River				√				
Mersey River			√	√				
Rubicon River			√	√				
King Island								
Little Porky Creek		√						

Cover Photo

Newcastle Bight is a large coastal embayment stretching 32 kilometres from the mouth of the Hunter River to the volcanic headlands of Port Stephens. It is a predominantly wild place with sand dunes up to 40 metres high and as wide as 1200 metres in places. Behind the rolling frontal dunes lie melaleuca forest, banksias, cabbage tree palms and rainforest supporting a diverse range of flora and fauna. Rich also in Aboriginal and European cultural heritage, the Bight was recently nominated for listing with the Australian Heritage Commision. In the face of increasing pressure from sandmining (see inset photo) and urban development it is now imperative that all public land on the Bight be dedicated as a conservation reserve. There are many coastal regions around Australia with areas of unallocated public land of high conservation value. Identifying such areas and, where appropriate, allocating conservation tenure will help protect key coastal habitats for the benefit of all Australians. (Cover and inset photography: Bernadette Smith)