

**BLACKMAN BAY MARINE FARMING DEVELOPMENT
PLAN JANUARY 2000**

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CAUTION: The maps shown throughout this document are not to be used for navigation. For navigation purposes appropriate hydrographic charts should be used. Additionally the coastline detail shown is reproduced from a 1:25000 scale giving a horizontal accuracy within 12.5 metres of true position.

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Introduction

The State Government has recognised the need for a policy to guide the management of the State's coastal resources on a more sustainable basis. The coastal zone of Tasmania is both vulnerable and valuable, which Government has recognised with initiatives to ensure that there is a long-term strategy for the management of this zone.

One important economic use of the coastal zone around Australia is marine farming. This industry has grown rapidly in Tasmania since the establishment of shellfish culture in the 1960s and finfish farming in the 1980s. In 1995 the Tasmanian Government introduced specific legislation known as the *Marine Farming Planning Act 1995*, to facilitate sustainable and integrated growth of marine farming in the State.

This is one of a series of marine farming development plans which have been prepared for the main aquaculture regions of the State. The Plan uses zoning principles to identify areas of coastal waters where future marine farming operations may occur, while taking into consideration other users of the coastal zone. This Plan has been developed with extensive public consultation. Consideration has been given to factors such as the physical suitability of the water, the current legal situation and the desire to minimise impacts on other users of the coastal zone, whether recreational or commercial.

This marine farming development plan consists of three Parts: an environmental impact statement; development proposals, which consists of the areas available for marine farming; and management controls and operational constraints affecting activities within the plan area.

An important component of marine farming development is an extensive environmental monitoring program to ensure that the industry operates in an environmentally sustainable way. This should ensure that the Plans are consistent with "sustainable development", a key component of the State's Resource Management and Planning System, and a specific objective of the *Marine Farming Planning Act 1995* under which this Plan has been prepared.

Part I. - Environmental Impact Statement

This Environmental Impact Statement describes the area covered by the Blackman Bay Marine Farming Development Plan September 1999, including an outline of existing marine uses and existing industry operations. The potential impacts of marine farming on other users and values in the coastal zone have been considered in the placement of marine farming zones. Issues in relation to land under the control of local councils and the Marine and Safety Authority Tasmania have also been considered in conjunction with those authorities to ensure a coordinated approach to developments in the coastal zone.

The Tasmanian Aquaculture and Fisheries Institute (TAFI) conducted an initial environmental survey for Blackman Bay in September and October 1998, *Environmental Assessment Of Proposed Marine Farming Zones In Blackman Bay*. The results of this survey are detailed in Mitchell et al (1999) and their summary is attached as an appendix to Part I of this Plan. This information and other relevant information has been used to assess the suitability of proposed sites for marine farming activities. It also ensures that areas of ecological significance or areas that appear sensitive to disturbance are not zoned for marine farming. This information will also be used to determine the requirements for the collection of further baseline environmental information.

Ecological and other impacts are outlined in this document. To reduce any adverse impacts controls on activities within the zones have been developed. These are outlined in management controls and accompany the Blackman Bay Marine Farming Development Plan September 1999.

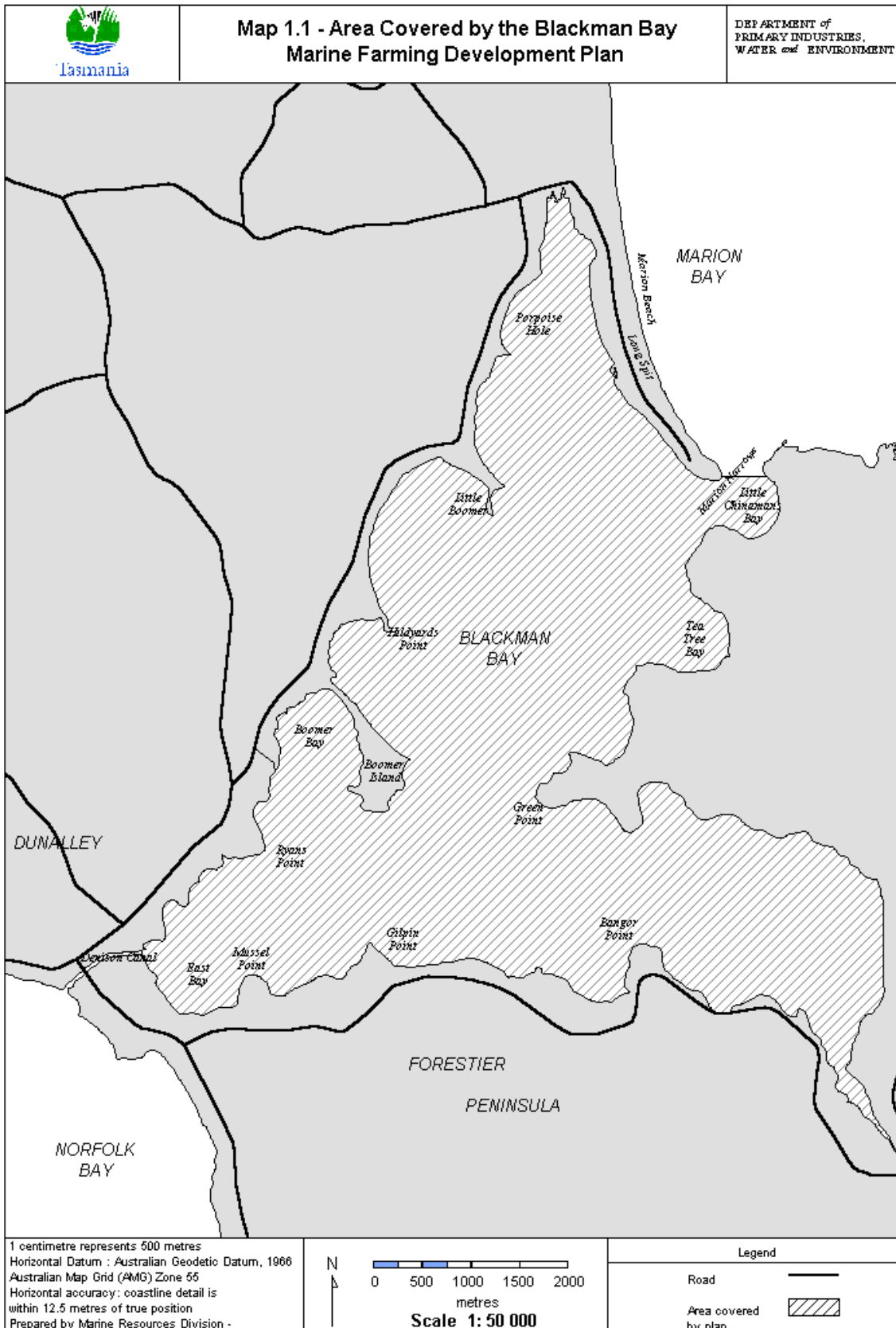
1. **General Introduction**

Blackman Bay is located on the South East Coast of Tasmania, centred on approximately 42° 52' south, 147° 51' east, between Marion Bay to the north east and the Denison Canal to the south west. The Bay is bounded by the Forestier Peninsula to the south and east, Dunalley to the south west and Long Spit to the north. The region is approximately 50 km by road from Hobart.

The area covered by this Plan includes the waters of Blackman Bay bounded to the west by a line across the eastern end of Denison Canal and to the east by a line drawn from the end of Long Spit to the tip of the point immediately north of Little Chinaman's Bay. Map I.1 shows the Plan area.

Blackman Bay falls within two municipal boundaries. The land to the north and west of the Bay falls within the municipality of Sorell. The majority of this land is zoned Rural with a strip of coastal reserve running around the foreshore zoned Open Space. A small region of Reserved Residential land exists at the south western corner of Blackman Bay. There is also a small area zoned Industrial at the Dunalley Wharf.

The land to the south and east consists of the Forestier Peninsula and falls within the municipality of Tasman. The majority of this land is zoned Rural with a strip of coastal reserve running around the foreshore zoned Open Space. The Tasman scheme also captures the Waters of Blackman Bay which are zoned Lakes, Rivers, Waters and Seas.



2. Characteristics of Blackman Bay

2.1 Physical Features

Blackman Bay has two inlets, a natural opening at Marion Narrows to Marion Bay and a man made canal to Norfolk Bay at Dunalley. The Bay covers approximately 2700 hectares below the high tide mark. Of this, approximately 366 ha are exposed at low tide. The Bay is approximately 7.3 km in length (north-south) and 6.4 km in width (east-west) along its greatest lengths.

The north west region of the Bay, north of Boomer Bay and Green Point, has minor gutters and channels draining into a deeper, relatively narrow channel. Part of this channel has been dredged and is used as the main navigation channel for larger vessels. The region in the north east of the Bay around the Marion Narrows is mobile, with frequently shifting sand banks and channels posing problems for navigation.

The Bay varies in depth between intertidal and 8 m at low tide with a main channel from the east connecting with Denison Canal to the west. There are other channels in the Bay running in a similar direction with small channels branching from north east to the south west. A deeper hole, in the north west of the Bay, known as the Porpoise Hole, is formed behind the frontal dune system to the ocean side.

The Bay has a catchment area of approximately 140 km² and is fed by six minor water courses which generally only flow after periods of prolonged heavy rain (Tasmanian Shellfish Quality Assurance Program, 1991).

The geology of the land surrounding Blackman Bay is dominated by dolerite hills with associated flats and marshes and sandy coastal flats and marshes. The spit at Marion Bay that forms the north eastern boundary of the Bay is formed by sand dunes with a deep, uniform, undifferentiated sand. Swamps and marshes in the region consist of a uniform clay soil supporting closed heath and scrub (Davies 1988).

2.2 Climate

The cool temperate climate of the Blackman Bay region is maritime influenced with extremes less common than in inland areas. In summer the area is influenced by afternoon sea breezes. Annual average rainfall is 665mm (Bureau of Meteorology pers comm.).

2.3 Hydrodynamics

A study of the hydrodynamics of the Bay was undertaken for this Plan. The results of this study are discussed in detail in Mitchell et al (1999).

Tidal range in Blackman Bay is approximately 0.5 m. The average low tide volume of the Bay was calculated at approximately 33.9 million m³ with an average high tide volume of approximately 47.6 million m³. The average volume of water entering Blackman Bay each tide was approximately 13.7 million m³ which is 28.7% of the total volume. The average flushing time for the entire bay is approximately 3.5 tidal cycles.

The water movement for the south eastern region of the Bay (to the east of Green Point) was calculated separately. The average low tide volume for this section of the Bay was

approximately 6.2 million m³ and the average high tide volume was approximately 9.4 million m³. The average volume of water entering this part of the Bay on each tidal cycle was approximately 3.3 million m³, which is approximately 35% of the average high water volume in this region of the Bay. Water volume in this eastern arm was approximately 24% of the total volume of the Bay.

A drogue study was also undertaken during the preparation of this Plan. Full details are available in Mitchell et al (1999). The study indicated that there appeared to be no significant flow into the Porpoise Hole. Water flow in Boomer Bay corresponded to the wind direction with no direct link to water flow from either end of Blackman Bay. There was significant flow for about half an hour in a south westerly direction as the tide at the Denison Canal was going out while the tide at the Marion Narrows was still coming in. It would appear that Boomer Bay and the eastern part of Blackman Bay do not receive any new water from outside the Bay on the incoming tide. They still have on an average a 0.5 m rise and fall in tide.

2.4 Water Quality

The disposal of land based effluent into coastal waters may impact on the marine environment including marine farming activities if effluent treatment procedures are not adequate. It is therefore essential that the processing and monitoring of land based effluent material meets with the requirements of the relevant authorities prior to discharge. The responsibility for the control of these activities in the area surrounding Blackman Bay falls within the jurisdiction of Local and State Government.

There is no discharge from industrial operations or sewage treatment plants into Blackman Bay. Residential developments on the north western coastline of the Bay are serviced by septic tanks (Tasmanian Shellfish Quality Assurance Program, 1991). The Sorell Council does have some concerns in relation to effective treatment of effluent from septic tanks in the Boomer Bay region and is currently considering corrective measures (Sorell Council pers comm.).

The Department of Health and Human Services under the Tasmanian Shellfish Quality Assurance Program (TSQAP) undertake sanitary surveys of all marine farming areas within Tasmania. Depending upon the results of a survey, a classification is given to that particular area which controls the harvesting of shellfish directly for human consumption. The Blackman Bay region has been regularly monitored since the development of shellfish marine farming operations. Should new zones be approved in the region a TSQAP classification and monitoring program will be required prior to the sale of shellfish for human consumption.

2.5 Protected Environmental Values

The State Policy on Water Quality Management 1997 requires that Protected Environmental Values (PEV) will be determined by agreement between the Board of Environmental Management and Pollution Control and the DPIWE, as a planning authority, for marine farming zones prescribed within a marine farming development plan.

Protected environmental values are values or uses of the environment for which it has been determined that the environment should be protected. Following the setting of PEV for marine farming zones through this planning process, the Board of Environmental

Management and Pollution Control will define water quality objectives which will be used to determine if PEV are being met, over time.

The Following PEV have been set for all marine farming zones prescribed by the Blackman Bay Marine Farming Development Plan January 2000 under Part 3-Water Quality Objectives 7.1A, B and E of the State Policy on Water Quality Management 1997:

- A. Protection of Aquatic Ecosystems
 - (ii) Modified (not pristine) ecosystems
 - (a) from which edible fish, crustacea and shellfish are harvested;
- B. Recreational Water Quality and Aesthetics
 - (i) Primary contact water quality
 - (ii) Secondary contact water quality;
- E. Industrial water supply - Aquaculture.

2.6 Sediment Characteristics

A general survey of the sediments showed a substrate type of medium-fine sand with variable amounts of shell debris in most areas. Sediments in the northern region of Blackman Bay generally consisted of medium sand, which reflects the stronger currents in this area. Areas of reduced flow had sediment of medium-fine sand/silt with the substrate relief in most sites uneven with rippled formations observed towards the southern end of the Bay. Irregular uneven substrate relief with numerous raised and depressed burrows was noted within the north western region of the Bay (Mitchell et al 1999).

A detailed description of the cores from samples collected during the preparation of the Plan are available in the report, Initial Environmental Data for the Proposed Marine Farming Zones within Blackman Bay (Mitchell et al 1999). In most of the cores collected the sediment was composed of a light olive surface layer of 2.5 - 10 cm in depth, overlaying a darker olive to grey material. The particle size analysis indicated a medium-fine sand/silt with material retained in the sieves greater than 0.5 mm being small shells or shell debris, seagrass, algae or detritus. In some samples collected the predominate particle size indicated a more sandy environment with limited sites dominated by high silt/clay levels.

2.7 Seagrass

There are extensive areas of seagrass in Blackman Bay, with dense beds at some locations. A survey of seagrass species and distribution conducted by Rees (1993) identified and reported two species in Blackman Bay, *Zostera muelleri* and *Heterozostera tasmanica*. Mitchell et al (1999) noted *Heterozostera tasmanica* and identified a further two species within the Bay *Halophila australis* and *Ruppia cf megacarpa*.

Sparse *Halophila australis* was identified at two locations towards the southern end of the Bay, dense *Ruppia cf megacarpa* within the tidal arm to the east, and *Heterozostera tasmanica* at most sites sampled (Mitchell et al 1999). Small beds of *Zostera muelleri*, were identified on the intertidal flats in Boomer Bay and near the shack region north of the Porpoise Hole (Rees 1993).

Rees (1993) calculated that there was approximately 70% seagrass cover within Blackman Bay. Mitchell et al (1999) supports this calculation but differs on species coverage. Mitchell et al (1999) also made visual assessments of vegetation cover with estimations of percentage of seagrass and epiphytic cover.

2.8 Aboriginal Heritage

For the past 35000 years Aboriginal people have lived in Tasmania. The Pydairrme people were based on the Tasman Peninsula and moved up and down the East Coast to Little Swanport and the Eastern Marshes (Terry 1996). During this time they harvested the shellfish, hunted native animals, gathered plant foods and utilised the Blackman Bay region for every day living.

The remnants of these activities can be seen in Aboriginal middens and artefact scatter that can be found around the coastline of Blackman Bay (T Dunbabin pers comm.). These sites and artefacts are extremely significant to today's Aboriginal community. The sites and artefacts are also of world archaeological significance.

2.9 Social and Economic Description

The township of Dunalley is located on the south western coastline of Blackman Bay.

Dunalley, which was proclaimed a township by 1840, originated as a major trading port servicing the surrounding district. By 1887 there were two small vessels continually trading between Hobart and Dunalley and the township consisted of ten houses, a hotel and a semaphore station. In 1904 the Port became more significant with the completion of the Denison Canal, which enabled coastal steamers to service the East Coast from Hobart (Terry 1996).

Dunalley was also the region's major fishing port. Rock lobster and scale fish were the main species sought. Fish processing industries were also established in the township from at least 1914 when barracouta was smoked using sawdust for fuel. Fish Canneries of Tasmania developed a cannery and associated infrastructure in Dunalley in 1942, which supplied overseas troops. The company processed rock lobster, scale fish, scallops and sharkfins (Terry 1996).

Road transport eventually became more economical and replaced the coastal traders. By the 1950's Dunalley's growth had come to an end. The region's down-turn as a trading port was followed by a decline in the fish processing industries. The population of Dunalley fell during the mid 1960's as fishing and agriculture employment declined.

In recent times Dunalley still provides a port for a local fishing fleet. Agriculture, tourism and aquaculture have emerged as principal economic industries for the region. The town is located on the State's major tourism route to Port Arthur. Aquaculture has become a significant industry in the region providing employment on marine farms and within established hatcheries.

The total number of occupied dwellings has gradually increased since the mid 60's, possibly reflecting broader social trends associated with changed household structures.

The population of Dunalley has varied over the years as shown by ABS data. (Table 1)

Census Year	Population of Dunalley	Total Number of Occupied Dwellings
1966	253	75
1971	270	83
1976	247	85
1981	203	79
1986	286	105
1991	306	112
1996	286	115

Table 1.1 Population Trends Dunalley 1966 - 1996
Source: ABS Tasmanian Cat No 2794.6

3. Existing Marine Uses

3.1 Fauna

Long Spit, the Porpoise Hole and the coastline surrounding the northern region of Blackman Bay holds important feeding and roosting habitat for migratory wading birds. Up to 1000 birds from New Zealand and Siberia spend up to four months each summer in the area. Resident shorebirds, including Hooded Plovers and Pied Oystercatchers, breed in the area. There are also other species of seabirds and waterfowl that make extensive use of the region throughout the year (E Woehler, pers comm. Tas. Group of Birds Australia). In November 1999 Long Spit was proclaimed a Private Nature Reserve for its values to shore birds and geomorphology.

Disturbance of these birds can lead to the birds being unable to accumulate sufficient fat (energy) reserves for migration, or in breeding failure by the resident species. Marine farming activities within this Plan have been limited to south of an imaginary line drawn between the northern tip of Little Boomer Point to the eastern tip of Little Chinaman Bay.

Blackman Bay was one of a number of sheltered bays and estuaries that were designated shark nursery areas in the early 1960s where the taking of either school shark (*Galeorhinus galeus*) or gummy shark (*Mustelus antarcticus*) has been prohibited (Williams and Schaap, 1992).

3.2 Navigation and Boating

The Denison Canal links Norfolk Bay to Blackman Bay thence to Marion Bay. The Canal was excavated and dredged between Norfolk Bay and Blackman Bay in an effort to reduce the time taken for fishing fleets to move from the east coast to Hobart without going around the Tasman Peninsula. The Canal has been important to navigation since it opened in 1904 when coastal steamers used it to trade between Hobart and the East Coast (Terry 1996).

Today the use of the Canal is primarily limited to smaller commercial fishing vessels and recreational craft. Access to Marion Bay from the Denison Canal occurs via a marked navigation channel which runs north east through Blackman Bay. This channel is shown in Map 1.2.

There are a number of public and private jetties located around the coastline of the Bay the largest one located at East Bay adjacent to the Dunalley township. There are also a number of registered moorings located within East Bay.

Blackman Bay provides a sheltered waterway for recreational boating activities. Such activities are however limited due to the general shallowness of the waterway.

3.3 Commercial and Recreational Fishing

There are currently no marine reserves within the Plan area, but a number of restrictions apply to recreational and commercial fishing:

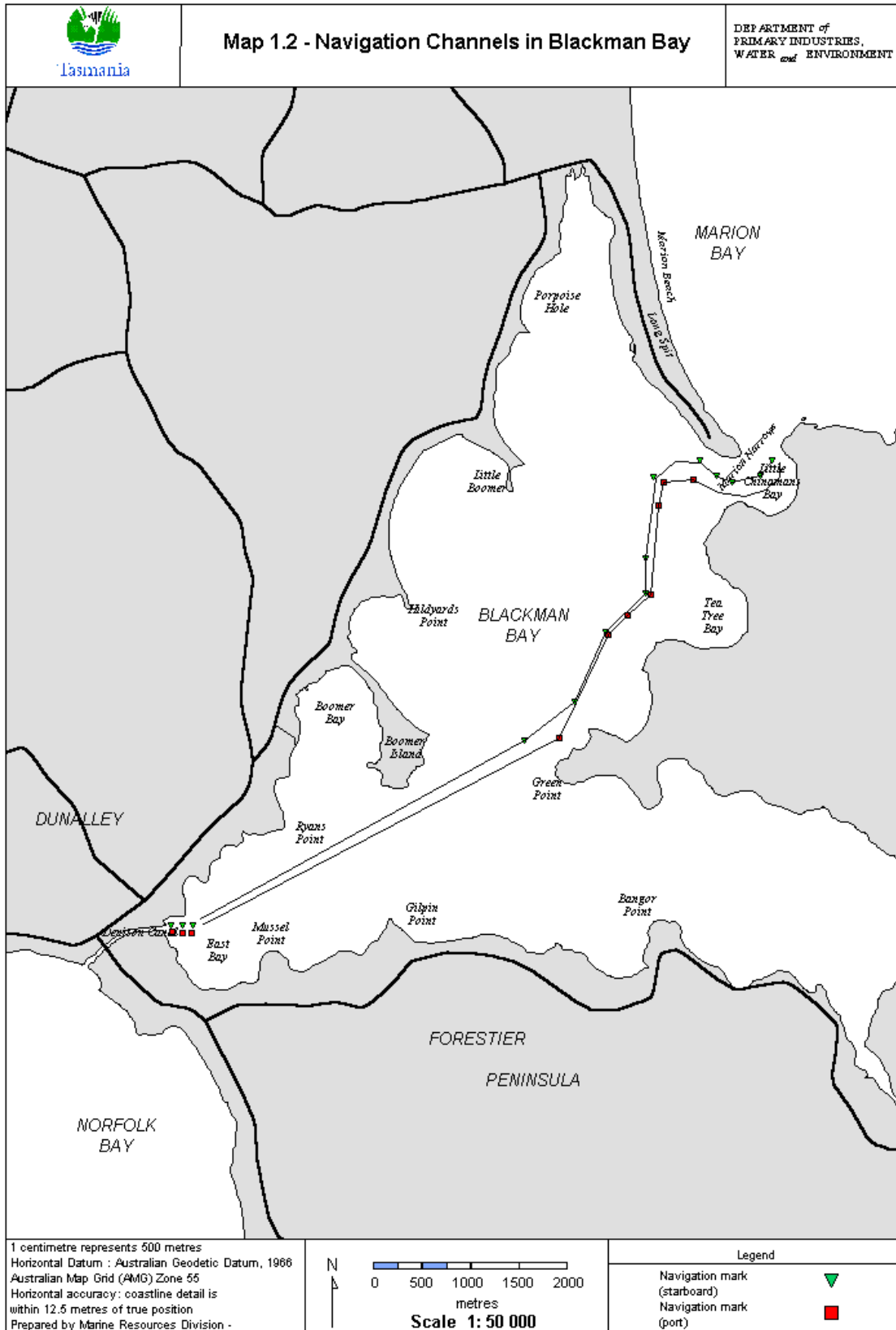
- no school (snapper) or gummy shark can be taken within Blackman Bay, which has been declared as a Shark Nursery Area; and
- only one bait net, beach seine net, cast net, dip net, and graball net can be used per person. No mullet nets are allowed.

Commercial fishing activities occur within Blackman Bay. In 1998 the main species sought included flounder, garfish, squid and mullet. There were also small quantities of flathead, octopus, stingray and Warehou taken. The methods used over this period for commercial fishing included spearing, purse seining, fish trapping and dip netting.

Recreational fishing also occurs within Blackman Bay, the main species sought are flounder, flathead and salmon. The majority of recreational flounder fishing is done by spearing and some by netting. Flathead and salmon are usually caught by line.

3.4 General Recreation

There are a number of holiday houses located on the north western coastline of Blackman Bay. Long Spit on the north eastern side of the Bay is used by surfers to access one of the States premier surfing locations known as “Boneyard”. Recreational fishermen also use the spit to gain access to Marion Bay. Camping occurs at Little Chinaman Bay. The waters of Blackman Bay are limited in their use for recreational activities due to the shallow nature of the Bay and seagrass cover. Sailing activities occasionally occur in the south western area of the Bay.



4. **Marine Farming in the Plan Area**

4.1 Suitability for Marine Farming

Blackman Bay is considered to have a number of advantages for marine farming operations, these include:

- water temperatures suitable for the production of shellfish;
- there has been no history of marine farm closures due to toxic dinoflagellate blooms;
- the area is a sheltered shallow waterway containing intertidal areas suitable for the culture of oysters using intertidal methods;
- the region is an established marine farming industry area within the State, in which experience has evolved resulting in a good working knowledge of the local environment.

Limitations on the future growth of the marine farming within the Plan Area include:

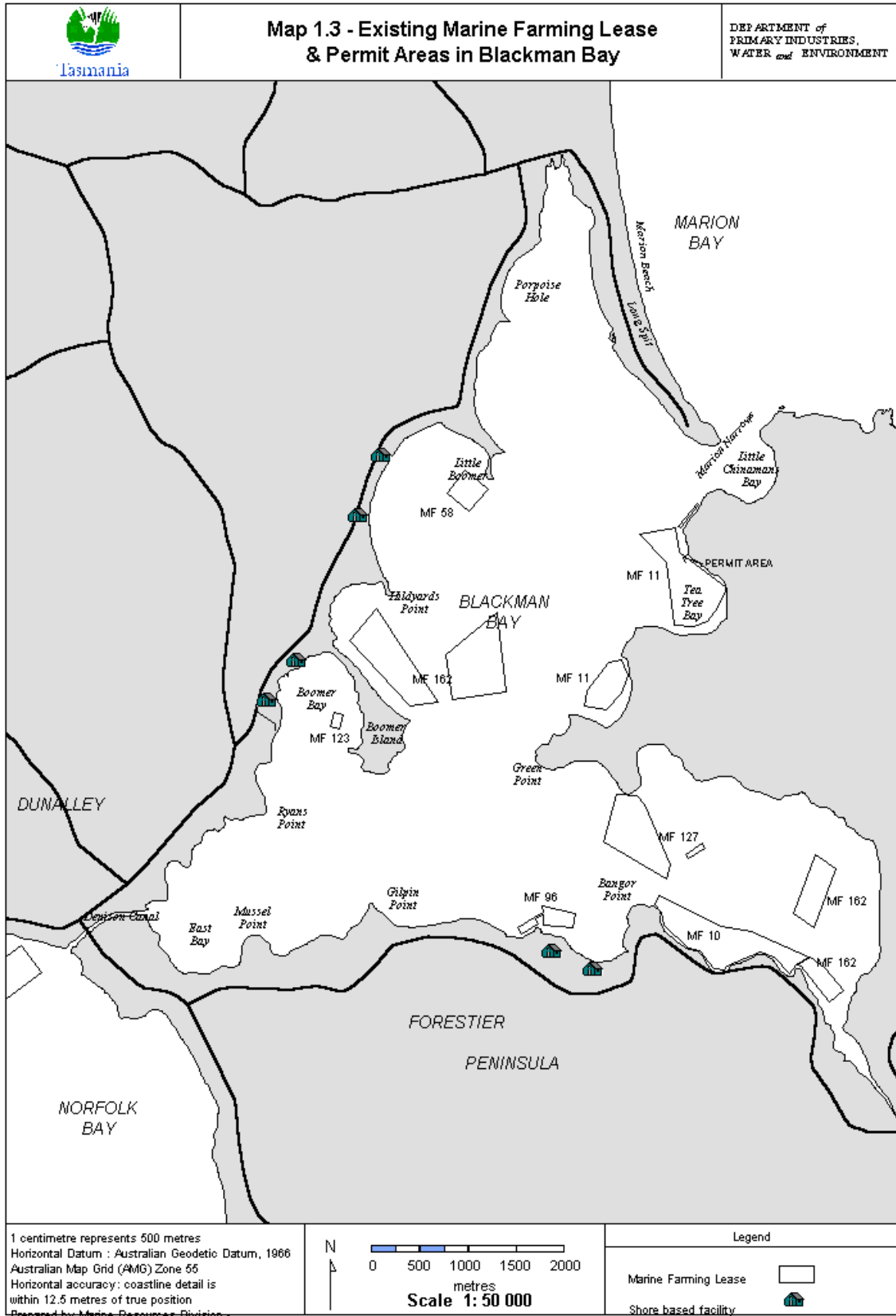
- the need to minimise the effects of marine farming operations on other user groups of the Bay;
- the need to minimise conflicts with existing land use activities, including tourism, recreation and residential activities;
- poor current flow in some sections of the Bay;
- the need to consider important habitats for bird populations;
- rapidly moving sandbars.

4.2 Existing Marine Farms

The current marine farming activities within the Plan area are limited to the culture of shellfish. The area is not considered suitable for the culture of finfish species.

There are 7 marine farm leases within Blackman Bay covering an area of 246.289 ha. There is also an area used for abalone research to the north of Tea Tree Bay. This research occurs under a permit issued under section 12 of the *Living Marine Resources Management Act 1995*. The existing marine farms and permit areas are shown in Map I.3.

The current marine farmers within Blackman Bay are of the opinion that some of the existing lease areas are located in areas of poor water flow, dense seagrass beds and extremely soft substrate. These opinions are supported by the results from an initial environmental survey undertaken by TAFI (Mitchell et al 1999). These conditions make some of the existing leases areas uneconomical to farm.



To achieve sustainable development of the existing lease areas within Blackman Bay, subject to the provisions of the *Marine Farming Planning Act 1995*, it is the planning intention to allow for the potential relocation of all or parts of some existing lease areas to within identified marine farming zones. The zones identified for the potential relocations are considered to have conditions better suited to the culture of shellfish.

The specific details of these potential relocations are detailed in Part 3 - Development Proposals, of this Plan.

The total leasable area within Blackman Bay will be reduced by 31.556 ha.

4.3 Infrastructure and Service Facilities

Blackman Bay is located approximately 45 minutes from the Hobart Airport, via the Arthur Highway.

Shore based facilities associated with the existing marine farming operations and abalone research are located on the southern and western coastlines of the Bay. These range from sheds for grading, storage and some packing, to abalone hatchery facilities. The existing infrastructure includes:

- on the southern coastline, two sheds;
- Boomer Bay, 3 sheds and jetty;
- Bay Road north of Boomer Island, two sheds.

There is also an oyster hatchery and abalone hatchery and nursery located adjacent to the Denison Canal.

Shore based facilities are essential to the on-water marine farming operations in Blackman Bay. Any expansion of the existing shore based facilities or the development of new shore based facilities will need to be coordinated with local councils.

5. **Impacts of Marine Farming**

The impacts of marine farming vary in their nature and intensity. Many impacts will be of a beneficial nature, none more evident than the creation of wealth and employment to the State economy. There are seven shellfish farms in Blackman Bay. In 1998 these farms employed 18 permanent and casual persons. Production in 1998 is estimated to have a farm gate value in excess of \$613 000 per annum.

In addition to the above direct economic impacts of the marine farms, there is a range of indirect impacts that are commonly referred to as the “multiplier effect”. The indirect employment effect of every 10 ha of fully developed water would be around 3 to 4 persons. These persons would be employed in spat production, processing plants and the supply of electricity, transport services, ice, ropes, anchors, buoys, surveying, fuel, boats, etc (UNITAS, 1996)

Infrastructure costs to establish an intertidal farm including racking, seed trays, baskets etc is estimated at around \$70 000 for 6 km of racking (UNITAS, 1996). The cost of on shore facilities such as sheds, sorting tables, sieves, tractors, boats is estimated at \$66 000 for a farm containing 3 km of racking (UNITAS, 1996).

Extensive marine farming of filter feeding shellfish also has the potential to have a beneficial impact in highly eutrophic estuaries where nutrient enrichment has occurred due to land based activities, resulting in dense algal blooms. The shellfish feed on the algae thus improving the water quality and the excess nutrients are removed from the system when the shellfish are harvested (Newell, 1989, FAO, 1995).

Marine farming requires good quality water and as a consequence where marine farming operations occur there is an added commercial emphasis to the responsibility of resource managers to require adequate controls on developments in the general area to ensure that the water quality of the marine environment is maintained.

The development of aquaculture techniques (in particular the hatchery rearing of juveniles) has been used to investigate fishery enhancement with the potential existing for the enhancement of finfish, shellfish and crustacean species in the wild.

Settlement of oysters outside shellfish farms has also provided a resource for recreational oyster gathering. They also represent a potential commercial opportunity for wild harvesting. The DPIWE has developed this opportunity and a policy relating to the harvesting of wild Pacific oysters is in place.

There is a growing interest from tourists visiting the State in the marine farming industry. This interest has developed further than just the consumption of the local product with tourists expressing interest in a range of marine farming operations. As a consequence some marine farmers and tourist operators have diversified and now offer marine farm tours. The tourist industry in the past has used the marine farming industry to assist in the promotion of the State's clean green image and as a fine food producer. Blackman Bay is located on the State's major tourist route to Port Arthur.

The negative impacts of marine farming nevertheless require attention. There are the obvious impacts such as the alienation of lease areas from general use, and the visual and noise impacts arising from the operation of a marine farm. They include farm infrastructure, such as buoys or racks in the water, and more people and boat traffic in the area.

Impacts on the water quality and seabed in the vicinity of marine farms are not so obvious, and coastal communities are concerned that long-term ecological damage may occur. They are also concerned that an introduced species could become established in the wild as a pest.

In general terms the main impacts of marine farming have been well documented overseas, (Gowen & Rosenthal 1993, Baird *et al* 1996). There has also been some limited research on the impacts of shellfish culture on the local environment.

5.1 Ecological Impacts

Changes to Sediments

There are a number of potential changes that can be caused by shellfish farming in the immediate and surrounding sediments. The primary effect is generally an increase in nutrient concentrations in sediments underneath the cultured shellfish.

Filter feeding shellfish feed on microscopic algae (phytoplankton) and detritus obtained from the waters they are growing in. They do not require any additional feeding. Even so, shellfish farming may result in the build-up of some excretions below the holding containers on racks or longlines.

The material digested by the oysters is converted to shell and meat, which is harvested by the marine farmer, and faeces and pseudofaeces which is deposited into the environment. The deposited material is utilised by microorganisms and benthic fauna present in the area. Utilisation of this material will vary according to the amount deposited, number and types of microorganisms and benthic fauna present, as well as current flow in the area (Mitchell, 1999). In fact the degree to which an impact is considered significant often relates to changes in the structure of biological communities.

Potential environmental problems may occur if deposits are excessive and the utilisation rate is exceeded by supply, causing a depletion of oxygen in the area. Such conditions are detrimental to the growth of shellfish and have not been a problem in Tasmania, most probably due to low stocking densities, current flows and farm management (Mitchell, 1999).

The ecological impacts of shellfish culture have been outlined in Hecht and Britz (1992), who state that organic sediment can build up under mussel longlines and rafts. This build up would be negligible compared with current finfish culture, primarily because the shellfish make use of the plankton and particulate organic matter existing in the water. Furthermore the effect is unlikely to be significant at stocking densities presently practised in Tasmania which are much lower than those prevailing in some overseas countries.

The Blackman Bay Marine Farming Development Plan contains management controls to restrict the density of shellfish held on farms by limiting the amount of racking and post and wire to 1.1 km per ha and 4.4 km per ha respectively, and longlines to 1.1 km per ha. Such stocking densities result in a conservative approach to further reduce the minimal impacts of shellfish farming. Marine farmers will also be required to undertake a monitoring program, the results of which will be used to track environmental conditions and determine future licence conditions.

The installation of marine farming equipment provides substrate that in many cases may not have previously existed in an area. A number of animal and plant species are able to settle on this equipment where previously they would be unable to do so. Disposal and decomposition of these fouling organisms in the water could increase organic compounds in the sediments. Similarly, removal of organisms from the shellfish during harvesting and processing operations could result in substantial organic build-up if they are thrown back into the water.

Management controls within this Plan restrict the manner in which this material can be disposed of.

Removal of Suspended Food Material

Because shellfish are totally reliant on the food available in the water, the production of algal food in the growing area is important in determining how many shellfish can be grown. If there are too many shellfish in a particular growing area, there may not be sufficient microscopic algae to feed all the farmed shellfish and the other filter feeding invertebrates. Quite apart from the possible effects on existing species, this is of concern to shellfish farmers because the shellfish will grow more slowly if the food supply is limited. Farmers may change their farm management in relation to food availability, for instance by altering stocking density or row spacing.

Research undertaken by the South Australian Research and Development Institute (Hone, 1996) measured growth rates and densities of native filter feeding shellfish within marine farms. The results indicated that there was no significant effect on competing filter feeding shellfish providing stocking rates were controlled.

Management controls contained within this Plan restrict the density of shellfish held on farms by limiting the amount of racking, post and wire or longlines per ha.

Release and Settlement of Pacific Oyster Larvae

An effect of the culture of Pacific oysters in Tasmania has been the release and settlement of the species outside of farming areas. Such settlement is perceived by some people as a nuisance, due to the sharp nature of their shells, whilst others consider these oysters a delicacy and a recreational resource to be harvested.

Pacific oysters generally spawn seasonally, triggered by an increase in water temperature and other factors such as salinity, dissolved oxygen, pH and various chemical substances in the seawater (Hone, 1993). In Tasmania this usually occurs during the warmer summer months when water temperatures rise above approximately 18°C for several consecutive days. In the Blackman Bay region marine farmers have found that Pacific oysters usually spawn in January and February.

Spawning may consist of several events over a period of hours or weeks depending on environmental conditions (Hone, 1993). Each female releases millions of eggs into the water, and those that are successfully fertilised by sperm from male oysters hatch into larvae after about 24 hours. The oyster larvae float in the water column for around 3 weeks before they metamorphose and settle on the bottom as juvenile oysters. During this 3 week period the oyster larvae can move long distances if strong currents are present, and their survival is totally dependent on a range of environmental conditions and on currents moving the larvae to areas suitable for settlement.

Pacific oysters were introduced into Tasmanian waters in the late 1940s and 1950s by the CSIRO in an attempt to expand oyster cultivation in Australia. The first shipments originating from Japan occurred in 1947 and 1948 with another two in 1951 and 1952 (C Sumner, Thompson J M, 1952, 1959).

Pacific oysters were first cultured in Blackman Bay in the 1970s and currently there are seven marine farming leases licensed to grow Pacific oysters. As outlined above settlement of spat and establishment of wild populations is influenced by a wide range of factors. The specific combinations of these factors determines if there will be a successful spat settlement and if the population can establish and flourish. To date there have not been significant populations of Pacific oysters established in Blackman Bay and it may be assumed that the suitable combination of conditions has not occurred during the decades of oyster farming.

Other Marine Invertebrate Fauna

As the Pacific oyster is an introduced species, there is the potential for these to affect Tasmanian ecosystems. No studies have been undertaken in Tasmania on the impacts of established wild populations of Pacific oysters on native marine invertebrate fauna.

“There is therefore no evidence to show whether or not native species have been displaced. Where Pacific oysters have settled their shells and the interstices between them are readily colonised by native epifaunal species. In areas where oysters have settled and formed small clumps around hard substrata in otherwise sandy or muddy areas, settlement of these oysters appears to increase the abundance of epifaunal species”. (Coleman 1996).

As already stated, within Blackman Bay there are not significant populations of wild Pacific oysters.

Seagrass

There are extensive seagrass beds within Blackman Bay. No studies have been undertaken in Tasmania on the impacts of marine farming activities on surrounding seagrass beds. Anecdotal evidence is contradictory, suggesting that the beds have increased in some areas where marine farms have been sited over or adjacent to seagrass beds, but in other areas they have shrunk. Results from a South Australian Research and Development Institute Shellfish Monitoring Program (Hone, 1996) showed that no detectable changes in seagrass communities were measured within marine farms, except for some localised loss associated with seed trays due to shading.

It is predicted that the impacts from Pacific oyster culture to seagrass beds found within some zones will be limited to directly beneath racking and dependant upon the type of baskets used and the density of oysters.

Diseases

Bonamia, a small protozoan parasite, was detected in Tasmania in 1992 in the native oyster (*Ostrea angasi*) population. The disease is known to cause mortalities in native oysters and has in fact decimated large sections of the European oyster industry since it was first discovered in the late 1970s. The strain found in Tasmania is thought to be different to the European strain and is considered to be endemic to Tasmanian waters. This strain does not infect Pacific oysters but has the potential to cause problems in the culture of native oysters (Department of Primary Industry & Fisheries 1992).

Chemical Contaminants/Additives

Intertidal shellfish farms generally use wooden racks, which are often pressure treated with preservatives. No problems associated with leaching of chemicals or accumulation in shellfish have been encountered. No chemicals are used in the rearing of shellfish.

5.2 Visual Impacts

Marine farming equipment in coastal waters, as with any structures on the water, will have some degree of visual impact on residents and other users of an area. This equipment will generally consist of racking, buoys, navigational markers and so on.

The general appearance of marine farms will vary with the species farmed and the management strategies of the operator. The zones proposed in Blackman Bay include shallow sand flats and some sections of deeper water. The current methods of intertidal shellfish culture consist of post and racking or post and wire methods. Such methods of culture will not be highly visible, except at low to medium tides when racks emerge. Typically deepwater shellfish leases will consist of parallel rows of buoys within a lease area. Management controls within this Plan require posts and racking to be neat and tidy and all buoys to be of a low and uniform colour and shape.

The area surrounding the Blackman Bay estuary is not a pristine landscape and has been subject to a range of developments and landscape modifications. These include development of townships, residential areas, sheds associated with rural industries, orchards, jetties, boatsheds and forestry operations. It is considered that the visual impacts of marine farming infrastructure as a result of the proposals for Blackman Bay would not be inconsistent with the range of developments that have occurred on land surrounding the estuary.

5.3 Access Restrictions

Navigation

Marine farming equipment in the water, as with any structures in or on the water, will have some impact on the navigation of vessels (mainly recreational) in an area. The zones identified in this Plan do not fall within the navigation channels identified by Marine and Safety Authority Tasmania.

Recreation

Marine farmers are granted exclusive rights to the lease area, which prohibits the public from passing through or using the waters. This could conceivably restrict the recreational activities which may have previously taken place in the area. This access restriction will be limited to the allocated lease area at any particular time, not the overall zone area and will never exceed the maximum leasable area. The maximum leasable area within this Plan equates to approximately 8% of the total area of the Bay and as already mentioned represents a reduction in the existing lease area.

This draft Plan has attempted to minimise the potential conflict that may arise with other user groups of Blackman Bay. Marine farming zones have been positioned outside the majority of areas that have been identified as significant for recreation pursuits.

Commercial and Recreational Fishing

Marine farming activities within Blackman Bay will have some degree of impact on commercial and recreational fishing, in particular flounder spearing. The preferred sites for this activity are the shallow regions of the Bay which are also the desirable locations for marine farming operations. Marine farming operations within a marine farming zone will not exceed the maximum leaseable area set for that zone. Navigation and recreational activities will still be allowed within the zone area. Whilst many marine farmers around the State allow flounder fishermen within marine farming leases it must be acknowledged that a lessee is granted exclusive occupation of a lease area and could restrict access should he/she choose to do so.

The maximum leaseable area within this Plan equates to approximately 8% of the total area of Blackman Bay.

5.4 Other Impacts

Aboriginal Heritage

All Aboriginal sites in Tasmania are protected under the *Aboriginal Relics Act 1975*. Section 14 (1) of the Act states that to damage, destroy, remove, conceal or interfere with an Aboriginal relic requires a permit from the Minister for National Parks and Wildlife. This applies to all land tenures. The State Coastal Policy 1996 also applies to the protection of Aboriginal heritage.

As many Aboriginal sites are found on the coastal strip, activities undertaken in this area have the potential to impact those sites. Therefore Aboriginal heritage issues should be taken into consideration prior to any works or other activities on the coastal strip.

All of the marine farming zones proposed within this Plan occur below the highwater mark. It is predicted that marine farming operations within these zones will have minimal impact to known aboriginal sites. Any shore based facilities resulting from the location of marine farming zones will be required to address the above legislative requirements.

Noise

Many uses of our coastal waters create noise; marine farming is one. The impact of that noise will depend on weather conditions and background noise. Noise impacts from marine farming operations will usually be caused by such movement of boats, routine procedures in working of the lease and human activity. Marine farming activities are required to conform to DPIWE guidelines on noise control.

Debris

There is a possibility, usually during extreme weather conditions, of structures breaking away from marine farms and littering the surrounding foreshore, whilst in the water this

debris has the potential to pose a hazard to navigation. Management controls within this Plan require lease holders to remove this equipment as soon as practically possible.

Predator Control

The control of predators on shellfish farms is usually limited to netting of baskets to exclude birds and skates, or the relocating of native starfish.

5.5 Conclusion

There are a number of impacts that may result from marine farming operations. As discussed there are impacts such as the alienation of lease areas from general use and the visual and noise impacts arising from the operation of a marine farm. Consideration has been given to the location, size and operation of the proposed zones within this Plan to mitigate these impacts.

The environmental and ecological changes are more difficult to predict and may be difficult to distinguish from the effects of on-land developments. The results of research and environmental assessments within the Plan area have been used to consider these impacts and develop management controls to reduce and monitor the impacts.

Consideration has been given to sustainable development of marine farming operations in the Plan area. Research has been undertaken within the Plan area in relation to hydrodynamics. The results of this research have been applied to determine the size and location of marine farming zones. Management controls will specify those farming practices and stocking densities considered appropriate for general application in the Plan area so as not to adversely affect existing marine farming operations and to regulate new operations.

The Plan area contains important habitat for birds. Consideration has been given to these values in the siting of the zones and it is considered that the impacts to flora and fauna will be minimal.

The economic benefits of relocating lease area are considered positive, with the potential to increase production and employment with the added flow-on benefits. There will be a responsibility on resource managers to ensure that water quality is maintained in the area and filter feeding shellfish may improve water quality. Opportunities may also exist for tourism activities associated with marine farming developments.

As with the prediction of any impact on the environment, there are limited guarantees. The Plan contains a range of management controls to mitigate or ameliorate the possible negative impacts of marine farming activities. The management controls include provisions for collecting baseline environmental data and implementing on-going monitoring programs to detect possible changes to the marine environment as a result of marine farming operations.

The marine farming licensing system in Tasmania is based on annual licences, which permit marine farming operations within a lease area. Whilst the lease may be for a fixed period of years the imposition of a requirement for annual licences gives the planning authority the

capacity and flexibility to impose annual environmental requirements which reflect the impact of farming operations on a year by year basis.

Thus the results of monitoring programs are incorporated in annual licence conditions, and drive requirements which produce an adaptive monitoring and management regime for marine farming operations so as to ensure sustainable development.

Part 1 - Appendix 1 to the Environmental Impact Statement

Environmental assessment of proposed marine farm zones in Blackman Bay

Mitchell, C. Crawford and A. Brown

Summary

An initial environmental assessment of proposed marine farming zones in Blackman Bay was conducted on 9th to 11th and 28th September 1998. Preliminary environmental data on substrate type, water depths, benthic flora and fauna for these zones were collected. Additionally, several sites within existing lease areas were also sampled. Preliminary studies were also conducted during 22nd July to 29th October 1998 to investigate and obtain information on current flow patterns, tidal heights and tide times within Blackman Bay. A detailed bathymetric survey was conducted from which high and low water volumes for the bay were calculated.

Tide data collected for the period 22 July 1998 to 29 October 1998 showed the average low and high tide heights (corrected to chart datum) to be 1.1 m and 1.6 m, respectively. The times of high and low water were variably different between Marion Narrows and the Denison Canal. On average, the times of high and low water at Marion Narrows occurred nine minutes before the Denison Canal. Tidal heights in the mid-bay region and eastern tidal arm showed a lag time of approximately 91 & 103 minutes, respectively, later than the Denison Canal. This most likely is because of slower water movement across the broader, shallow region of the bay.

Total surface area of Blackman Bay was calculated to be 2796 ha with approximately 31.4% (879 ha) of this area having suitable depths for intertidal oyster culture within the depth range 0 – 1 m (at chart datum). Depth range within the bay was 0 – 10 m with an estimated area of 13% (366 ha) of the bay exposed at low tide. The average high tide volume for the entire bay was calculated to be 47.6 million m³ and average low tide volume was 33.9 million m³. The average tidal prism was 13.7 million m³, however the actual extent of mixing, or exchange, of bay water with incoming ('new') marine water is unknown. The water volume in the eastern tidal arm was calculated to be 24% of the total bay volume. The observation of dense *Ruppia sp* beds, and reported poor oyster growths within this region of the bay indicate that the flushing rate within this tidal arm is poor. Most likely, the exchange is water resident within the bay proper with minimal inputs (or exchange) of fresh marine water from either Norfolk Bay (via the Denison Canal), or east coast water via Marion Narrows.

Preliminary observation of current flows from the drogue study showed more vigorous current flow in the northern region of the bay from Marion Narrows, predominantly following the main channels branching from this region (ie the main navigation channel and the channel leading into Tea Tree Bay). Little flow was observed into the Porpoise Hole in the north western region of the bay. Current flow to the north of the Denison Canal appeared weaker and less directional. Flow of water from the canal appeared to eddy in the region approximately 800 m from the exit of the canal, fanning out towards the northern and southern shoreline. Drogues released near Green Point and the mouth of the eastern tidal arm drifted towards the Denison Canal, with little evidence of flow towards the eastern tidal arm. Most current flow within the bay was surface flow with reduced current flow

observed at 2 m depth sub-surface. These preliminary observations of water movement within Blackman Bay suggest that most inflow of water is from Marion Bay.

Surveys showed a general substrate type of medium-fine sand with variable amounts of shell debris at most sites. Sites sampled within the northern region of the bay generally consisted of medium sand reflective of the stronger current flows experienced, with medium-fine sand/silt found at sites with reduced current flows. Substrate relief at most of the sample sites was uneven with rippled formations observed at the southern end of the bay near the Denison Canal entrance (site 1). Sample sites within the north-western region of the bay were characterised by an irregular uneven substrate relief with numerous raised and depressed burrows.

Vegetation cover was variable with moderate to dense cover observed at most sites and generally mixed cover of macroalgae and seagrass. Two seagrass species have previously been recorded within Blackman Bay, *Heterozostera tasmanica* and *Zostera muelleri* (Rees, 1993). During the zone surveys *Heterozostera tasmanica* was found to be the predominant species with variable percent cover observed at most sites sampled. Additionally, sparse *Halophila australis* was observed at two sites within the southern region of the bay and relatively dense cover of *Ruppia cf megacarpa* occurred within the tidal arm to the east of the bay. *Zostera muelleri* was not found at any of the sites sampled. Green filamentous algae (predominantly *Enteromorpha sp* and *Cladophora sp*) were observed at most sites and the brown alga *Asperococcus cf bullosus* was observed at several sites within the southern region of the bay, with relatively dense cover noted on occasions. *Undaria pinnatifida* was noted at one site (site 14) adjacent to the navigation channel near Tea Tree Bay, a region which experiences relatively strong current flows.

Variable epiphyte densities and types were noted on seagrass, with two sites in particular showing significant smothering of seagrass; sites 2 and 23 located within the southern and western region of the bay, respectively. Site 23 is within an operational marine farm and sediments at this site and at an adjacent site (site 22) showed a finer sand/silt substrate, loosely compacted with a “fluid” or “gelatinous” surface layer of flocculant matter. Entrapment of sediment and flocculant matter was observed on the seagrass and substrate at these sites indicative of restricted water movement through this region.

Seagrass, generally in association with macroalgae species, was observed adjacent to existing operational marine farms, and on occasions within marine farm areas. However, although there are currently six marine farms within Blackman Bay, none of these are in full production. Dense *Ruppia cf megacarpa* was found in the lease areas located within the tidal arm to the east of the bay and although oyster racking is still in place at one site, these lease areas have not been in use for some time.

NOTE: The Blackman Bay MFDP January 2000 was modified in 2012 following a review of the plan in 2010. Minor modifications were made to the plan including minor changes to the area and location of boundaries of some marine farming zones to correct anomalies identified through recent advances in electronic mapping systems. The minor changes were limited to sub-metre movements of zone boundaries and the subsequent area changes to zones.

The modifications are reflected in Part 2 - *Development Proposals* of the plan, in the table below that summarises the zones identified by the Blackman Bay MFDP, zone summaries and Maps 2.1 to 2.6. All other information contained in Part 2 - *Development Proposals* is from the original Blackman Bay MFDP January 2000 and should be considered in that context.

Part 2. - Development Proposals

1. Zone Plans

The following table summarises the zones identified in the Blackman Bay Marine Farming Development Plan January 2000.

Zone	Category of fish allowed for culture	Zone Area (ha)	Maximum leasable area (ha)
1	Shellfish, Seaweed	9.75	9.00
2	Shellfish, Seaweed	4.34	4.30
3	Shellfish, Seaweed	9.00	7.70
4	Shellfish, Seaweed	9.09	9.00
5	Shellfish, Seaweed	6.00	6.00
6	Shellfish, Seaweed	4.00	4.00
7	Shellfish, Seaweed	4.34	4.30
8	Shellfish, Seaweed	8.06	8.00
9	Shellfish, Seaweed	27.46	24.00
10	Shellfish, Seaweed	12.30	12.30
11	Shellfish, Seaweed	17.70	17.70
12	Shellfish, Seaweed	3.68	1.501
13	Shellfish, Seaweed	22.52	18.00
14	Shellfish, Seaweed	7.68	7.67
15	Shellfish, Seaweed	12.14	12.00
16	Shellfish, Seaweed	1.00	1.00
17	Shellfish, Seaweed	17.00	17.00
18	Shellfish, Seaweed	3.37	3.30
19	Shellfish, Seaweed	6.50	6.50
20	Shellfish, Seaweed	3.51	3.507
21	Shellfish, Seaweed	27.97	27.96
23	Shellfish, Seaweed	11.92	10.00
Total		229.33	214.738

The following information describes the individual marine farming zones identified by the Blackman Bay Marine Farming Development Plan January 2000.

Map 2.1 shows the marine farming zones in the context of Blackman Bay and Maps 2.3 to 2.6 show the locations of the zones at a larger scale.

Zone 1

Location

Zone 1 is located on the south-western side of Little Boomer approximately 100 metres from the coastline at its closest point.

Zone 1 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
1a	569752.98E	5255562.83N	42° 50.96'S	147° 51.2215'E	thence to
1b	570015.09E	5255342.38N	42° 51.0777'S	147° 51.4156'E	thence to
1c	569776.38E	5255147.07N	42° 51.1845'S	147° 51.2418'E	thence to
1d	569546.08E	5255333.66N	42° 51.085'S	147° 51.0713'E	thence to
1a	569752.98E	5255562.83N	42° 50.96'S	147° 51.2215'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 1 is approximately 9.75 ha.

Maximum Leasable Area

The maximum leasable area within Zone 1 is 9.00 ha.

Category of fish

The category of fish allowed for culture within Zone 1 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 1 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 4.70 hectares of marine farm lease number 58 to an area within Zone 1.

Map 2.3 shows Zone 1.

Zone 2

Location

Zone 2 is located on the eastern side of Little Boomer approximately 200 metres from the coastline at its closest point.

Zone 2 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
2a	570225.81E	5255745.97N	42° 50.8585'S	147° 51.5673'E	thence to
2b	570353.43E	5255711.20N	42° 50.8766'S	147° 51.6613'E	thence to
2c	570171.35E	5255422.61N	42° 51.0335'S	147° 51.5297'E	thence to
2d	570043.14E	5255464.53N	42° 51.0115'S	147° 51.4353'E	thence to
2a	570225.81E	5255745.97N	42° 50.8585'S	147° 51.5673'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 2 is approximately 4.34 ha.

Maximum Leasable Area

The maximum leasable area within Zone 2 is 4.30 ha.

Category of fish

The category of fish allowed for culture within Zone 2 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 2 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 4.30 hectares of marine farm lease number 58 to an area within Zone 2.

Map 2.3 shows Zone 2.

Zone 3

Location

Zone 3 is located on the eastern side of Little Boomer approximately 340 metres from the coastline at its closest point.

Zone 3 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
3a	570430.39E	5255789.71N	42° 50.8337'S	147° 51.7172'E	thence to
3b	570644.49E	5255751.45N	42° 50.8532'S	147° 51.8747'E	thence to
3c	570387.80E	5255362.79N	42° 51.0646'S	147° 51.6891'E	thence to
3d	570188.82E	5255414.92N	42° 51.0375'S	147° 51.5426'E	thence to
3a	570430.39E	5255789.71N	42° 50.8337'S	147° 51.7172'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 3 is approximately 9.00 ha.

Maximum Leasable Area

The maximum leasable area within Zone 3 is 7.70 ha.

Category of fish

The category of fish allowed for culture within Zone 3 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 3 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 7.70 hectares of marine farm lease number 127 to an area within Zone 3.

Map 2.3 shows Zone 3.

Zone 4

Location

Zone 4 is located on the eastern side of Little Boomer approximately 560 metres from the coastline at its closest point.

Zone 4 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
4a	570669.66E	5255746.95N	42° 50.8555'S	147° 51.8932'E	thence to
4b	570858.69E	5255708.59N	42° 50.8751'S	147° 52.0323'E	thence to
4c	570702.89E	5255396.88N	42° 51.0444'S	147° 51.9202'E	thence to
4d	570631.34E	5255332.99N	42° 51.0793'S	147° 51.8681'E	thence to
4e	570416.71E	5255361.11N	42° 51.0653'S	147° 51.7103'E	thence to
4a	570669.66E	5255746.95N	42° 50.8555'S	147° 51.8932'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 4 is approximately 9.09 ha.

Maximum Leasable Area

The maximum leasable area within Zone 4 is 9.00 ha.

Category of fish

The category of fish allowed for culture within Zone 4 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 4 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 9.00 hectares of marine farm lease number 10 to an area within Zone 4.

Map 2.3 shows Zone 4.

Zone 5

Location

Zone 5 is located on the eastern side of Little Boomer approximately 860 metres from the coastline at its closest point.

Zone 5 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
5a	570894.52E	5255700.96N	42° 50.8791'S	147° 52.0586'E	thence to
5b	571040.17E	5255631.95N	42° 50.9156'S	147° 52.1661'E	thence to
5c	571097.48E	5255447.06N	42° 51.0151'S	147° 52.2096'E	thence to
5d	570748.87E	5255404.55N	42° 51.04'S	147° 51.9539'E	thence to
5a	570894.52E	5255700.96N	42° 50.8791'S	147° 52.0586'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 5 is approximately 6.00 ha.

Maximum Leasable Area

The maximum leasable area within Zone 5 is 6.00 ha.

Category of fish

The category of fish allowed for culture within Zone 5 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 5 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 6.00 hectares of marine farm lease number 162 to an area within Zone 5.

Map 2.3 shows Zone 5.

Zone 6

Location

Zone 6 is located towards the centre of the northern half of Blackman Bay and is approximately 800 metres from the coastline at its closest point.

Zone 6 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
6a	570782.10E	5255363.65N	42° 51.0619'S	147° 51.9787'E	thence to
6b	570817.48E	5255220.13N	42° 51.1393'S	147° 52.0057'E	thence to
6c	571129.60E	5255271.67N	42° 51.1097'S	147° 52.2345'E	thence to
6d	571116.82E	5255371.32N	42° 51.0559'S	147° 52.2244'E	thence to
6a	570782.10E	5255363.65N	42° 51.0619'S	147° 51.9787'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 6 is approximately 4.00 ha.

Maximum Leasable Area

The maximum leasable area within Zone 6 is 4.00 ha.

Category of fish

The category of fish allowed for culture within Zone 6 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 6 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 4.00 hectares of marine farm lease number 11 to an area within Zone 6.

Map 2.3 shows Zone 6.

Zone 7

Location

Zone 7 is located towards the centre of the northern half of Blackman Bay and is approximately 700 metres from the coastline at its closest point.

Zone 7 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
7a	570851.08E	5255120.92N	42° 51.1927'S	147° 52.0311'E	thence to
7b	571124.98E	5255206.10N	42° 51.1451'S	147° 52.2316'E	thence to
7c	571167.93E	5255034.02N	42° 51.2379'S	147° 52.2644'E	thence to
7d	570948.18E	5254980.38N	42° 51.2681'S	147° 52.1035'E	thence to
7a	570851.08E	5255120.92N	42° 51.1927'S	147° 52.0311'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 7 is approximately 4.34 ha.

Maximum Leasable Area

The maximum leasable area within Zone 7 is 4.30 ha.

Category of fish

The category of fish allowed for culture within Zone 7 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 7 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 4.30 hectares of marine farm lease number 11 to an area within Zone 7.

Map 2.3 shows Zone 7.

Zone 8

Location

Zone 8 is located towards the centre of the northern half of Blackman Bay and is approximately 700 metres from the coastline at its closest point.

Zone 8 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
8a	570851.08E	5254832.17N	42° 51.3487'S	147° 52.0333'E	thence to
8b	571162.76E	5254997.92N	42° 51.2574'S	147° 52.2609'E	thence to
8c	571231.82E	5254727.40N	42° 51.4032'S	147° 52.3137'E	thence to
8d	570958.40E	5254630.30N	42° 51.4571'S	147° 52.1137'E	thence to
8a	570851.08E	5254832.17N	42° 51.3487'S	147° 52.0333'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 8 is approximately 8.06 ha.

Maximum Leasable Area

The maximum leasable area within Zone 8 is 8.00 ha.

Category of fish

The category of fish allowed for culture within Zone 8 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 8 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 8.00 hectares of marine farm lease number 162 to an area within Zone 8.

Map 2.3 shows Zone 8.

Zone 9

Location

Zone 9 is located towards the centre of the northern half of Blackman Bay and is approximately 700 metres from the coastline at its closest point.

Zone 9 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
9a	570616.03E	5255034.03N	42° 51.241'S	147° 51.8592'E	thence to
9b	570672.25E	5254318.55N	42° 51.6272'S	147° 51.9059'E	thence to
9c	570314.47E	5254287.90N	42° 51.6457'S	147° 51.6433'E	thence to
9d	570275.28E	5254613.50N	42° 51.47'S	147° 51.6121'E	thence to
9e	570268.98E	5254669.22N	42° 51.44'S	147° 51.6071'E	thence to
9f	570262.12E	5254722.89N	42° 51.411'S	147° 51.6016'E	thence to
9g	570224.61E	5255034.55N	42° 51.2428'S	147° 51.5717'E	thence to
9a	570616.03E	5255034.03N	42° 51.241'S	147° 51.8592'E	

GDA 94-ZONE 55

Zone Area

The area of zone 9 is approximately 27.46 ha.

Maximum Leasable Area

The maximum leasable area within Zone 9 is 24.00 ha.

Category of fish

The category of fish allowed for culture within Zone 9 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 9 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 12.00 hectares of marine farm lease number 162 and 12.00 hectares of marine farm lease number 10 to an area within Zone 9.

Map 2.3 shows Zone 9.

Zone 10

Location

Zone 10 is located east of Boomer Island and is approximately 500 metres from the coastline at its closest point.

Zone 10 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
10a	569421.43E	5253701.42N	42° 51.9674'S	147° 50.9918'E	thence to
10b	569617.91E	5253823.29N	42° 51.9005'S	147° 51.1352'E	thence to
10c	569806.40E	5253346.47N	42° 52.1571'S	147° 51.2773'E	thence to
10d	569491.13E	5253300.49N	42° 52.1837'S	147° 51.046'E	thence to
10a	569421.43E	5253701.42N	42° 51.9674'S	147° 50.9918'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 10 is approximately 12.30 ha.

Maximum Leasable Area

The maximum leasable area within Zone 10 is 12.30 ha.

Category of fish

The category of fish allowed for culture within Zone 10 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 10 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 12.30 hectares of marine farm lease number 162 to an area within Zone 10

Map 2.5 shows Zone 10.

Zone 11

Location

Zone 11 is located to the north of Boomer Island approximately 100 metres from the coastline at its closest point.

Zone 11 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
11a	569162.57E	5253556.53N	42° 52.0471'S	147° 50.8028'E	thence to
11b	569351.95E	5253277.29N	42° 52.197'S	147° 50.944'E	thence to
11c	569050.36E	5253234.21N	42° 52.2219'S	147° 50.7227'E	thence to
11d	568500.21E	5253840.72N	42° 51.8972'S	147° 50.3143'E	thence to
11e	568642.78E	5253933.54N	42° 51.8463'S	147° 50.4183'E	thence to
11f	569047.06E	5253476.16N	42° 52.0912'S	147° 50.7185'E	thence to
11a	569162.57E	5253556.53N	42° 52.0471'S	147° 50.8028'E	

GDA 94-ZONE 55

Zone Area

The area of zone 11 is approximately 17.70 ha.

Maximum Leasable Area

The maximum leasable area within Zone 11 is 17.70 ha.

Category of fish

The category of fish allowed for culture within Zone 11 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 11 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 17.70 hectares of marine farm lease number 162 to an area within Zone 11.

Map 2.5 shows Zone 11.

Zone 12

Location

Zone 12 is located to the west of Boomer Island approximately 100 metres from the coastline at its closest point.

Zone 12 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
12a	568180.89E	5253012.85N	42° 52.3462'S	147° 50.0858'E	thence to
12b	568234.54E	5253212.16N	42° 52.2382'S	147° 50.1237'E	thence to
12c	568402.91E	5253178.80N	42° 52.2553'S	147° 50.2476'E	thence to
12d	568357.19E	5252971.96N	42° 52.3673'S	147° 50.2156'E	thence to
12a	568180.89E	5253012.85N	42° 52.3462'S	147° 50.0858'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 12 is approximately 3.68 ha.

Maximum Leasable Area

The maximum leasable area within Zone 12 is 1.501 ha.

Category of fish

The category of fish allowed for culture within Zone 12 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 12 are prescribed in part 3 of this Plan.

Map 2.5 shows Zone 12.

Zone 13

Location

Zone 13 is located to the east of Boomer Island approximately 100 metres from the coastline at its closest point.

Zone 13 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
13a	570076.85E	5253350.12N	42° 52.1537'S	147° 51.4759'E	thence to
13b	569133.99E	5252780.30N	42° 52.4666'S	147° 50.7875'E	thence to
13c	569065.01E	5252678.09N	42° 52.5223'S	147° 50.7376'E	thence to
13d	568924.47E	5252591.23N	42° 52.57'S	147° 50.635'E	thence to
13e	569034.34E	5252527.33N	42° 52.6039'S	147° 50.7162'E	thence to
13f	569514.72E	5252849.30N	42° 52.4273'S	147° 51.0667'E	thence to
13g	569959.33E	5253035.82N	42° 52.3241'S	147° 51.3919'E	thence to
13h	570271.46E	5253309.32N	42° 52.1746'S	147° 51.6191'E	thence to
13a	570076.85E	5253350.12N	42° 52.1537'S	147° 51.4759'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 13 is approximately 22.52 ha.

Maximum Leasable Area

The maximum leasable area within Zone 13 is 18.00 ha.

Category of fish

The category of fish allowed for culture within Zone 13 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 13 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 18.00 hectares of marine farm lease number 162 to an area within Zone 13.

Map 2.5 shows Zone 13.

Zone 14

Location

Zone 14 is located to the west of Bangor Point approximately 20 metres from the coastline at its closest point.

Zone 14 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
14a	570328.01E	5251168.87N	42° 53.3307'S	147° 51.6767'E	thence to
14b	570412.98E	5251173.67N	42° 53.3276'S	147° 51.7391'E	thence to
14c	570721.16E	5251109.03N	42° 53.3609'S	147° 51.966'E	thence to
14d	570656.51E	5250955.65N	42° 53.4441'S	147° 51.9197'E	thence to
14e	570432.00E	5250964.33N	42° 53.4406'S	147° 51.7547'E	thence to
14f	570342.68E	5251043.74N	42° 53.3983'S	147° 51.6884'E	thence to
14g	570330.75E	5251065.71N	42° 53.3864'S	147° 51.6795'E	thence to
14a	570328.01E	5251168.87N	42° 53.3307'S	147° 51.6767'E	
14h	570336.71E	5251054.72N	42° 53.3923'S	147° 51.6839'E	thence to
14i	570330.74E	5250966.14N	42° 53.4402'S	147° 51.6802'E	thence to
14j	570196.75E	5250893.39N	42° 53.4803'S	147° 51.5824'E	thence to
14k	570160.95E	5250959.30N	42° 53.4449'S	147° 51.5555'E	thence to
14h	570336.71E	5251054.72N	42° 53.3923'S	147° 51.6839'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 14 is approximately 7.68 ha.

Maximum Leasable Area

The maximum leasable area within Zone 14 is 7.67 ha.

Category of fish

The category of fish allowed for culture within Zone 14 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 14 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 2.118 hectares of marine farm lease number 96 to an area within Zone 14.

Map 2.6 shows Zone 14.

Zone 15

Location

Zone 15 is located to the east of Bangor Point and is approximately 30 metres from the coastline at its closest point.

Zone 15 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
15a	571538.95E	5251231.53N	42° 53.2901'S	147° 52.5659'E	thence to
15b	571621.83E	5251304.68N	42° 53.2501'S	147° 52.6262'E	thence to
15c	571957.31E	5251054.89N	42° 53.3832'S	147° 52.8746'E	thence to
15d	572150.37E	5250968.44N	42° 53.4288'S	147° 53.0171'E	thence to
15e	572311.31E	5250957.53N	42° 53.4338'S	147° 53.1355'E	thence to
15f	572469.41E	5250922.16N	42° 53.452'S	147° 53.2519'E	thence to
15g	572441.89E	5250829.46N	42° 53.5022'S	147° 53.2324'E	thence to
15h	572302.21E	5250852.73N	42° 53.4904'S	147° 53.1296'E	thence to
15i	572100.61E	5250798.75N	42° 53.5208'S	147° 52.9819'E	thence to
15a	571538.95E	5251231.53N	42° 53.2901'S	147° 52.5659'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 15 is approximately 12.14 ha.

Maximum Leasable Area

The maximum leasable area within Zone 15 is 12.00 ha.

Category of fish

The category of fish allowed for culture within Zone 15 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 15 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 12.00 hectares of marine farm lease number 10 to an area within Zone 15.

Map 2.6 shows Zone 15.

Zone 16

Location

Zone 16 is located to the north of Bangor Point approximately 650 metres from the coastline at its closest point.

Zone 16 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
16a	572057.49E	5251821.49N	42° 52.9685'S	147° 52.9424'E	thence to
16b	572084.67E	5251779.45N	42° 52.991'S	147° 52.9627'E	thence to
16c	571916.93E	5251670.54N	42° 53.0508'S	147° 52.8403'E	thence to
16d	571889.68E	5251712.49N	42° 53.0283'S	147° 52.8199'E	thence to
16a	572057.49E	5251821.49N	42° 52.9685'S	147° 52.9424'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 16 is approximately 1.00 ha.

Maximum Leasable Area

The maximum leasable area within Zone 16 is 1.00 ha.

Category of fish

The category of fish allowed for culture within Zone 16 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 16 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 1.00 hectare of marine farm lease number 127 to an area within Zone 16.

Map 2.6 shows Zone 16.

Zone 17

Location

Zone 17 is located to the north of Bangor Point approximately 60 metres from the coastline at its closest point.

Zone 17 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
17a	571617.71E	5251653.40N	42° 53.0618'S	147° 52.6205'E	thence to
17b	571393.64E	5252312.38N	42° 52.707'S	147° 52.4509'E	thence to
17c	571318.44E	5252268.55N	42° 52.7311'S	147° 52.396'E	thence to
17d	571360.66E	5252007.87N	42° 52.8717'S	147° 52.429'E	thence to
17e	571182.78E	5251752.26N	42° 53.0108'S	147° 52.3003'E	thence to
17f	571688.10E	5251453.37N	42° 53.1694'S	147° 52.6738'E	thence to
17g	571737.81E	5251597.18N	42° 53.0914'S	147° 52.7092'E	thence to
17a	571617.71E	5251653.40N	42° 53.0618'S	147° 52.6205'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 17 is approximately 17.00 ha.

Maximum Leasable Area

The maximum leasable area within Zone 17 is 17.00 ha.

Category of fish

The category of fish allowed for culture within Zone 17 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 17 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 17.00 hectares of marine farm lease number 127 to an area within Zone 17.

Map 2.6 shows Zone 17.

Zone 18

Location

Zone 18 is located to the north of Bangor Point approximately 310 metres from the coastline at its closest point.

Zone 18 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
18a	571096.81E	5252055.40N	42° 52.8475'S	147° 52.2348'E	thence to
18b	571254.72E	5252029.72N	42° 52.8605'S	147° 52.351'E	thence to
18c	571135.18E	5251778.62N	42° 52.9968'S	147° 52.2651'E	thence to
18d	571037.91E	5251834.32N	42° 52.9673'S	147° 52.1932'E	thence to
18a	571096.81E	5252055.40N	42° 52.8475'S	147° 52.2348'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 18 is approximately 3.37 ha.

Maximum Leasable Area

The maximum leasable area within Zone 18 is 3.30 ha.

Category of fish

The category of fish allowed for culture within Zone 18 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 18 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 3.30 hectares of marine farm lease number 127 to an area within Zone 18.

Map 2.6 shows Zone 18.

Zone 19

Location

Zone 19 is located to the south of Tea Tree Bay approximately 50 metres from the coastline at its closest point.

Zone 19 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
19a	571283.94E	5254158.73N	42° 51.7101'S	147° 52.3563'E	thence to
19b	571365.41E	5254100.33N	42° 51.7412'S	147° 52.4165'E	thence to
19c	570931.41E	5253607.10N	42° 52.0101'S	147° 52.1016'E	thence to
19d	570856.37E	5253673.17N	42° 51.9748'S	147° 52.046'E	thence to
19a	571283.94E	5254158.73N	42° 51.7101'S	147° 52.3563'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 19 is approximately 6.50 ha.

Maximum Leasable Area

The maximum leasable area within Zone 19 is 6.50 ha.

Category of fish

The category of fish allowed for culture within Zone 19 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 19 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 6.50 hectares of marine farm lease number 11 to an area within Zone 19.

Map 2.4 shows Zone 19.

Zone 20

Location

Zone 20 is located to the west of Tea Tree Bay approximately 370 metres from the coastline at its closest point.

Zone 20 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
20a	571452.35E	5254732.16N	42° 51.3994'S	147° 52.4756'E	thence to
20b	571552.51E	5254734.32N	42° 51.3976'S	147° 52.5491'E	thence to
20c	571557.36E	5254382.16N	42° 51.5879'S	147° 52.5554'E	thence to
20d	571457.33E	5254382.23N	42° 51.5884'S	147° 52.4819'E	thence to
20a	571452.35E	5254732.16N	42° 51.3994'S	147° 52.4756'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 20 is approximately 3.51 ha.

Maximum Leasable Area

The maximum leasable area within Zone 20 is 3.507 ha.

Category of fish

The category of fish allowed for culture within Zone 20 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 20 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 3.507 hectares of marine farm lease number 11 to an area within Zone 20.

Map 2.4 shows Zone 20.

Zone 21

Location

Zone 21 is located to the west of Tea Tree Bay and includes area up to the high water mark of the coastline at its closest point.

Zone 21 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
21a	571487.36E	5255087.16N	42° 51.2074'S	147° 52.4986'E	thence to
21b	571777.35E	5255137.15N	42° 51.1787'S	147° 52.7111'E	thence to
21c	571843.35E	5255077.16N	42° 51.2108'S	147° 52.7601'E	thence to
21d	571912.35E	5254782.16N	42° 51.3698'S	147° 52.813'E	thence to
21e	572069.59E	5254660.74N	42° 51.4345'S	147° 52.9294'E	thence to
21f	572317.93E	5254467.87N	42° 51.5372'S	147° 53.1133'E	thence to
21g	572223.11E	5254260.79N	42° 51.6497'S	147° 53.0452'E	thence to
21h	572082.35E	5254357.15N	42° 51.5984'S	147° 52.9411'E	thence to
21i	571921.35E	5254309.15N	42° 51.6253'S	147° 52.8232'E	thence to
21j	571743.36E	5254303.15N	42° 51.6295'S	147° 52.6926'E	thence to
21k	571731.26E	5254413.14N	42° 51.5702'S	147° 52.6828'E	thence to
21l	571918.01E	5254418.50N	42° 51.5662'S	147° 52.8199'E	thence to
21m	571845.65E	5254473.90N	42° 51.5367'S	147° 52.7664'E	thence to
21n	571970.50E	5254656.99N	42° 51.437'S	147° 52.8566'E	thence to
21o	571781.35E	5254797.14N	42° 51.3624'S	147° 52.7167'E	thence to
21p	571662.36E	5254687.14N	42° 51.4225'S	147° 52.6301'E	thence to
21q	571437.35E	5254947.16N	42° 51.2833'S	147° 52.4629'E	thence to
21a	571487.36E	5255087.16N	42° 51.2074'S	147° 52.4986'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 21 is approximately 27.97 ha.

Maximum Leasable Area

The maximum leasable area within Zone 21 is 27.96 ha.

Category of fish

The category of fish allowed for culture within Zone 21 will be shellfish and seaweeds.

Management Controls

The management controls for Zone 21 are prescribed in part 3 of this Plan.

Special Provision

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 27.96 hectares of marine farm lease number 11 to an area within zone 21.

Map 2.4 shows Zone 21.

Zone 23

Location

Zone 23 is located to the east of Gilpins Point approximately 230 metres from the coastline at its closest point.

Zone 22 consists of all that area bounded by a line being from points defined by Geocentric Datum of Australia (GDA) co-ordinates:

ID	Easting	Northing	Latitude	Longitude	
23a	569116.21E	5251563.19N	42° 53.1243'S	147° 50.7835'E	thence to
23b	569116.26E	5251253.85N	42° 53.2915'S	147° 50.7858'E	thence to
23c	569502.16E	5251253.85N	42° 53.2894'S	147° 51.0693'E	thence to
23d	569502.11E	5251563.18N	42° 53.1222'S	147° 51.067'E	thence to
23a	569116.21E	5251563.19N	42° 53.1243'S	147° 50.7835'E	

GDA 94-ZONE 55

Zone Area

The area of Zone 23 is approximately 11.92 ha.

Maximum Leasable Area

The maximum leasable area within Zone 23 is 10.00 ha.

Category of fish

The category of fish allowed for culture within Zone 23 will be shellfish and seaweeds.

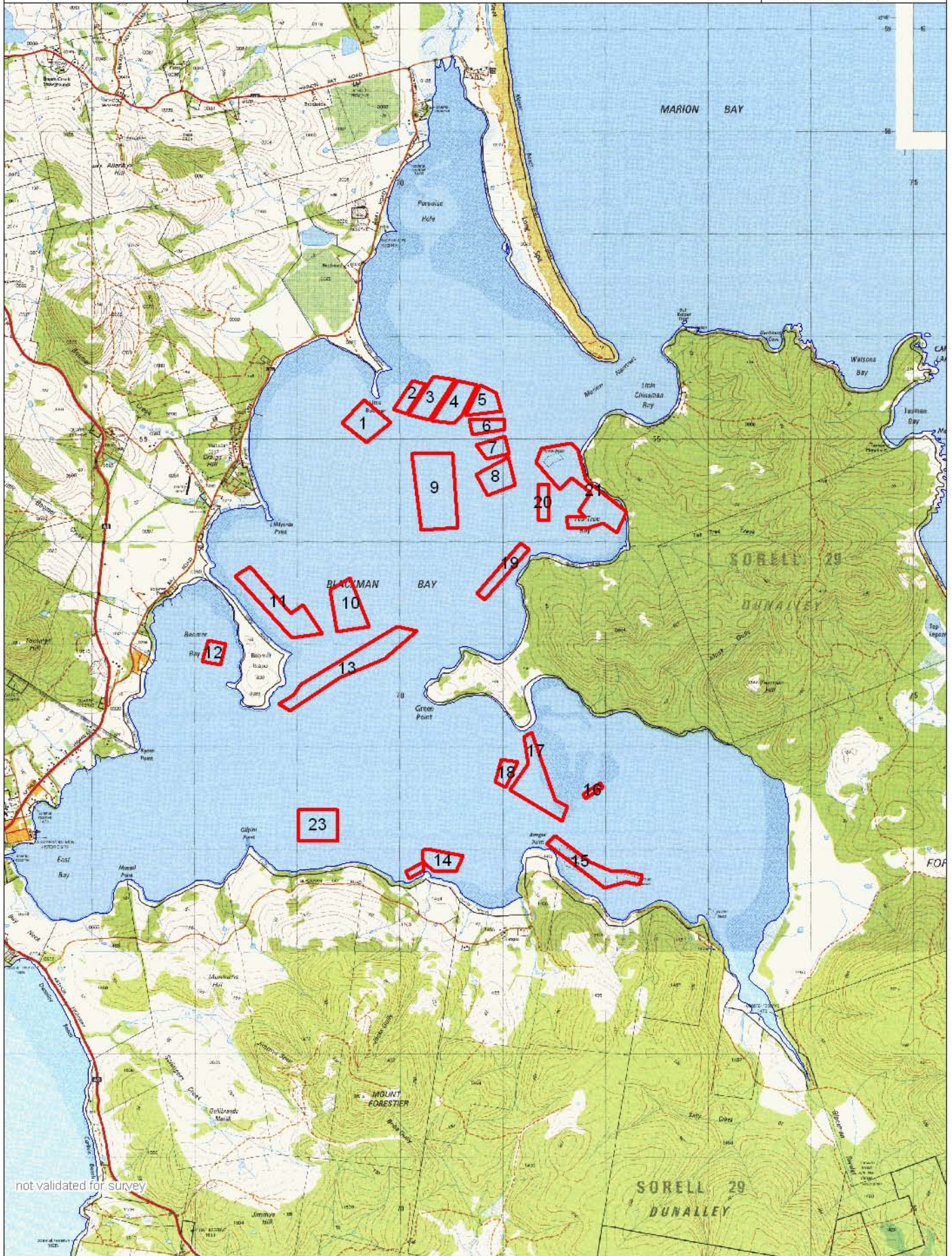
Management Controls

The management controls for Zone 23 are prescribed in part 3 of this Plan.

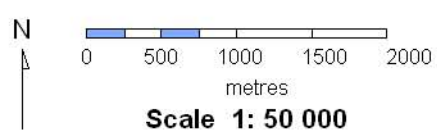
Special Provision



Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to provide for the relocation of 5.00 hectares of marine farm lease number 96 and 5.00 hectares of marine farm lease number 127 to an area within Zone 23.

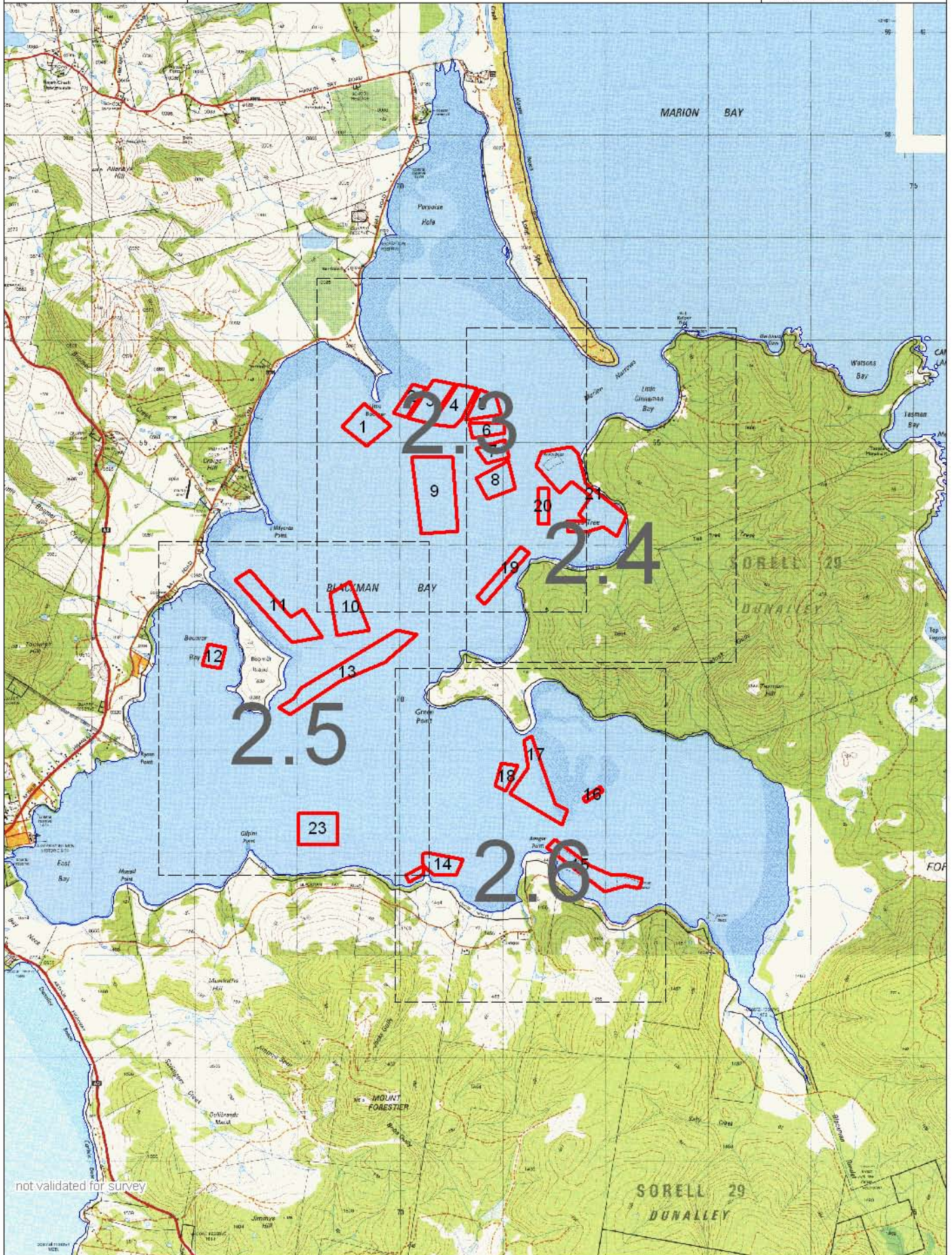
Map 2.5 shows Zone 23



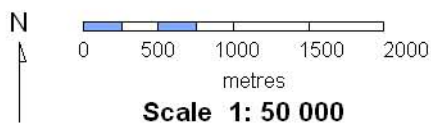
1 centimetre represents 500 metres
Horizontal Datum : MGA 94 Zone 55
Prepared by Marine Resources -



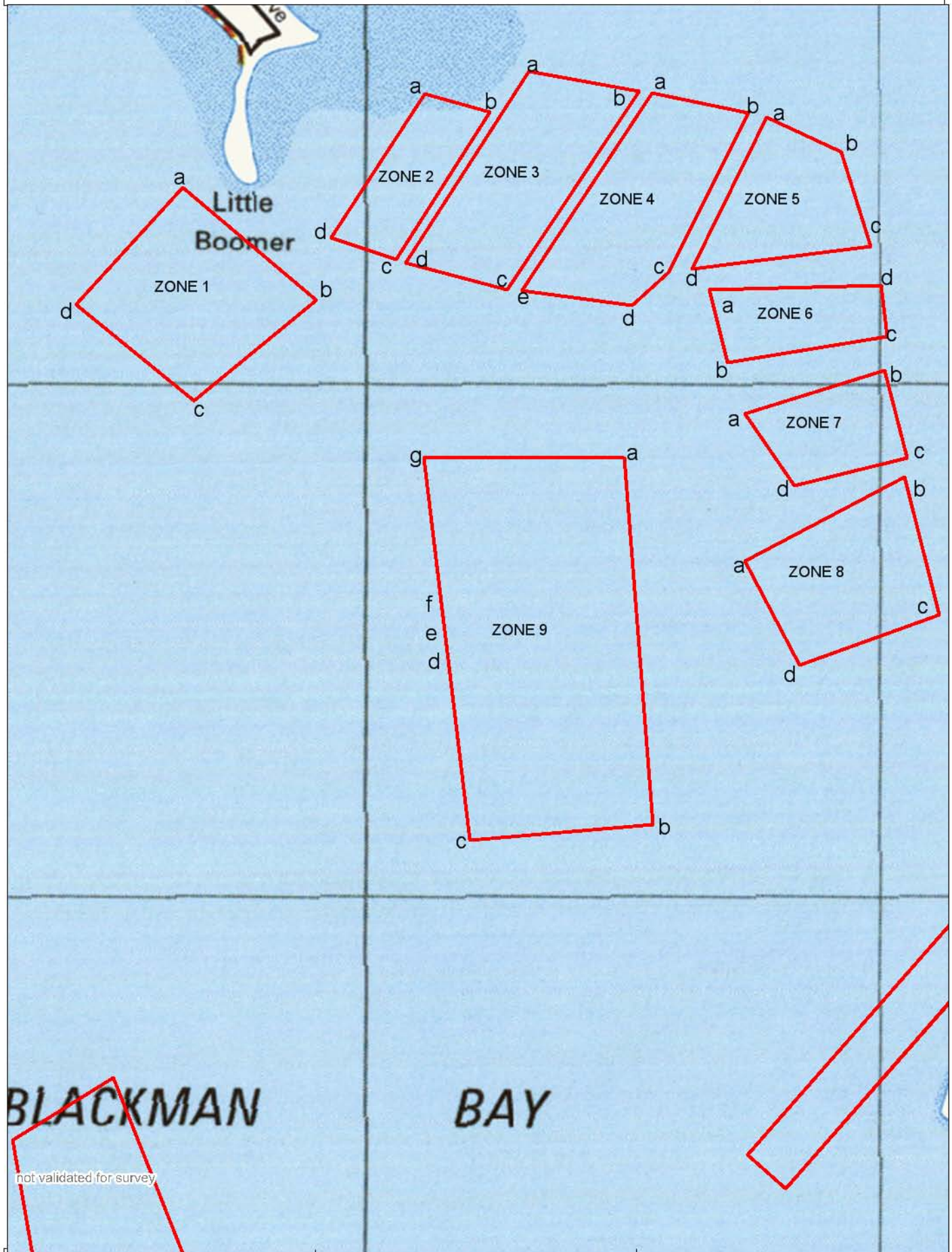
Legend	
Marine Farming Lease (Proposed)	
Marine Farming Zone (Proposed)	



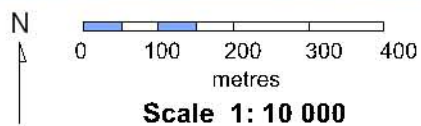
1 centimetre represents 500 metres
Horizontal Datum : MGA 94 Zone 55
Prepared by Marine Resources -



Legend	
Marine Farming Lease (Proposed)	
Marine Farming Zone (Proposed)	

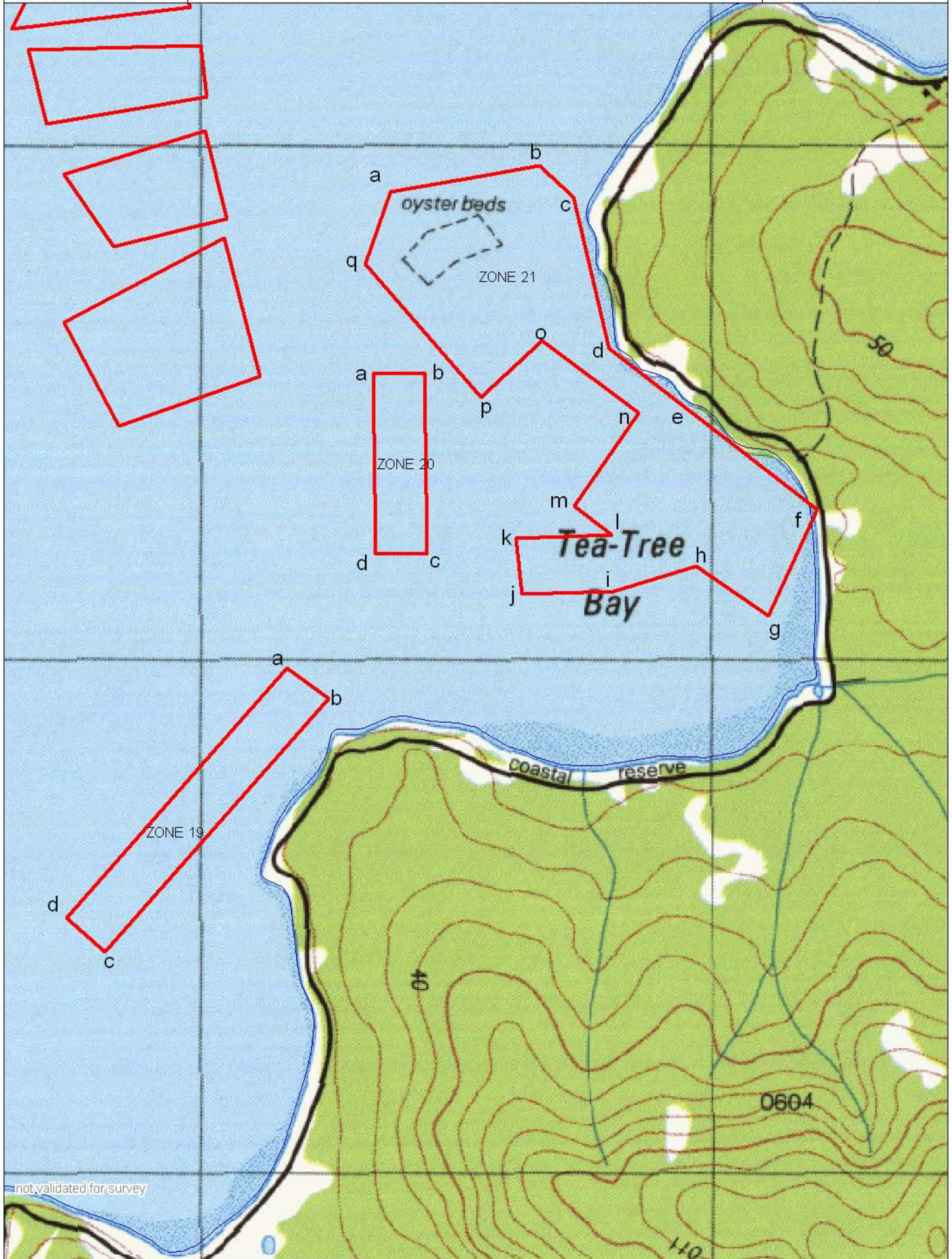


1 centimetre represents 100 metres
Horizontal Datum : MGA 94 Zone 55
Prepared by Marine Resources -

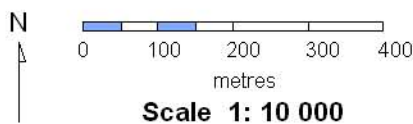


Legend

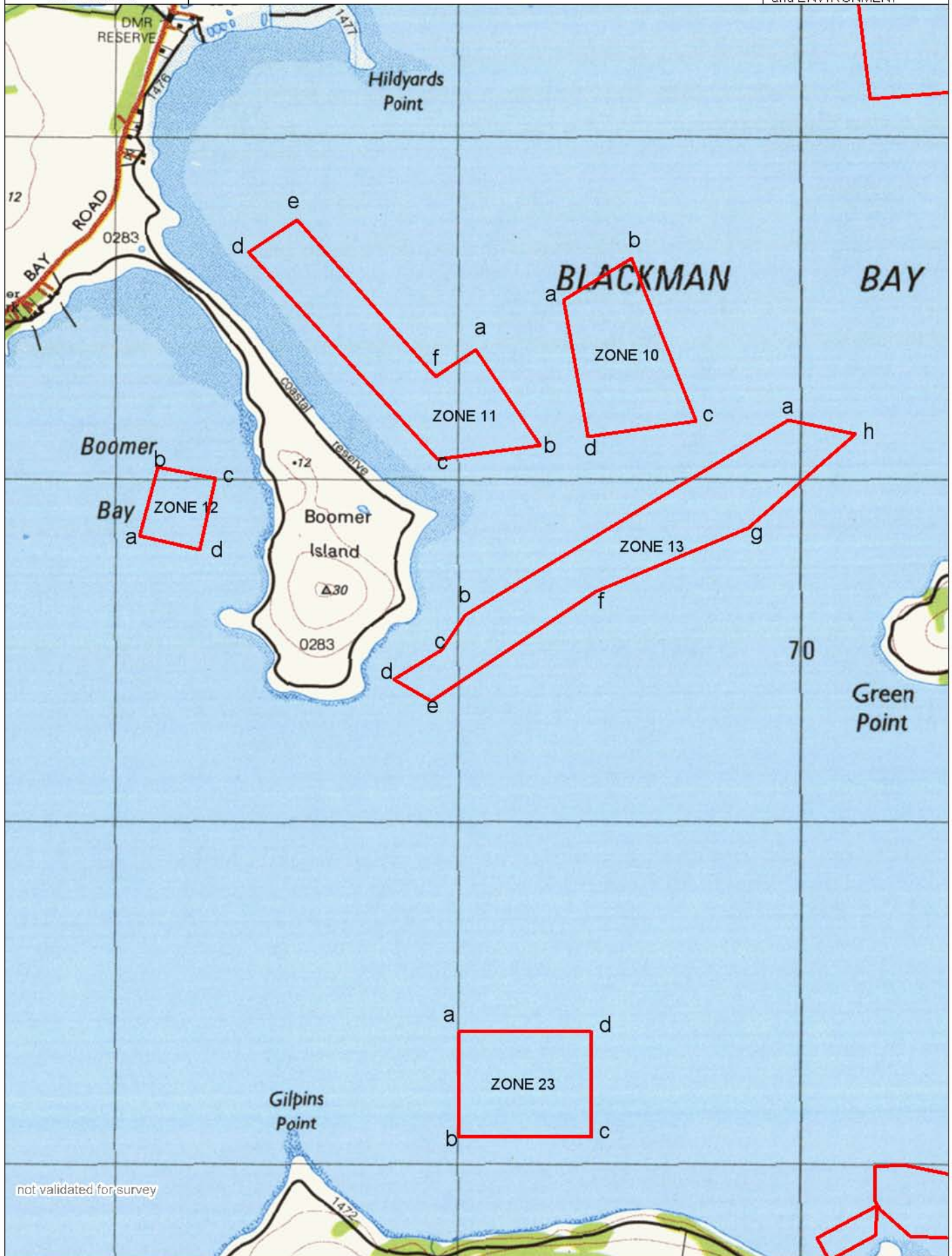
- Marine Farming Lease (Proposed) ————
- Marine Farming Zone (Proposed) ————



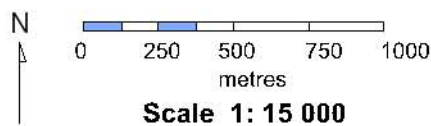
1 centimetre represents 100 metres
Horizontal Datum : MGA 94 Zone 55
Prepared by Marine Resources -



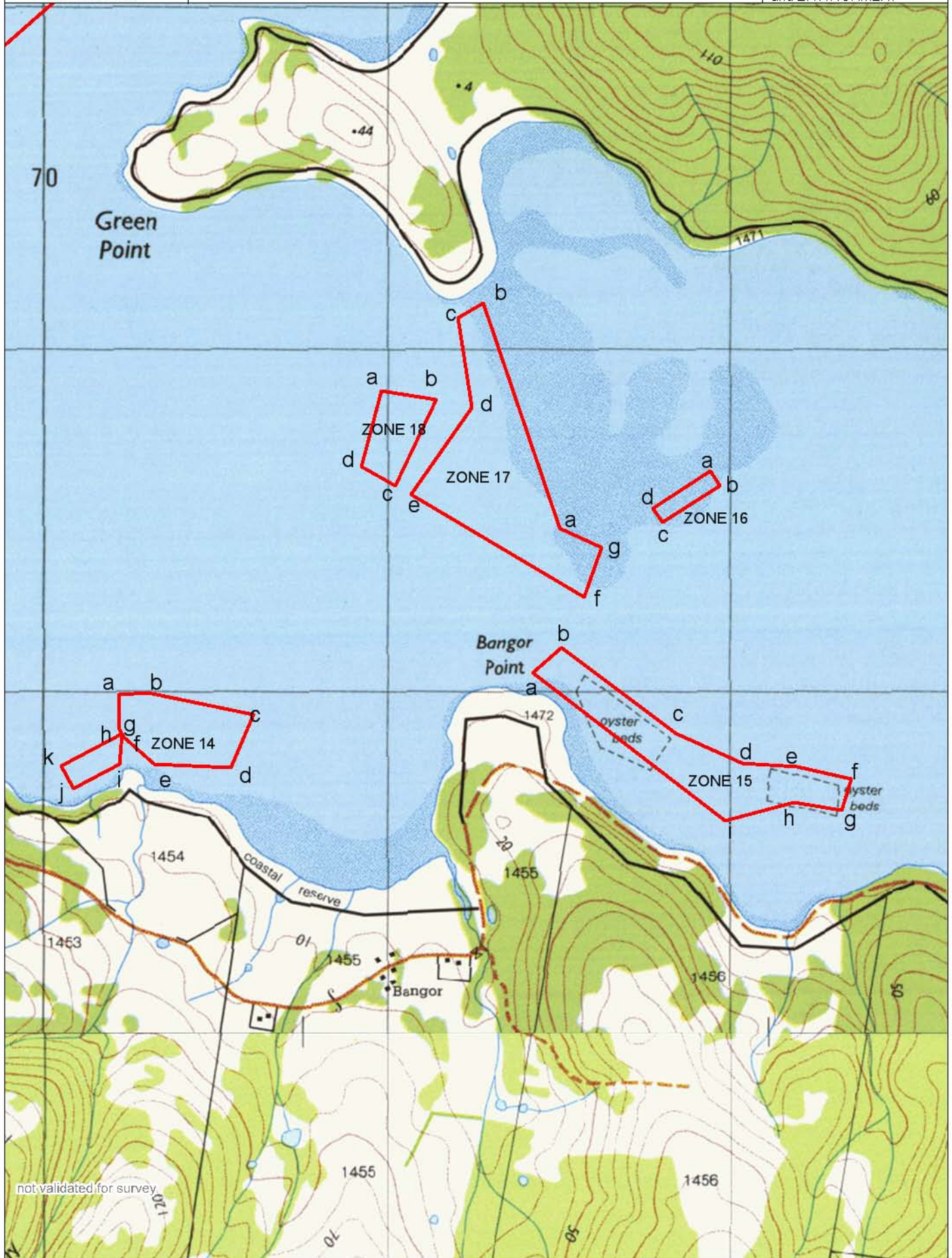
Legend	
Marine Farming Lease (Proposed)	—
Marine Farming Zone (Proposed)	- - - - -



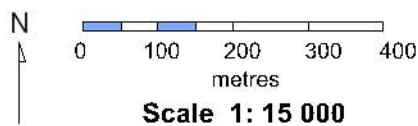
1 centimetre represents 250 metres
Horizontal Datum : MGA 94 Zone 55
Prepared by Marine Resources -



Legend	
Marine Farming Lease (Proposed)	-----
Marine Farming Zone (Proposed)	-----



1 centimetre represents 100 metres
Horizontal Datum : MGA 94 Zone 55
Prepared by Marine Resources -



Legend	
Marine Farming Lease (Proposed)	—
Marine Farming Zone (Proposed)	---

Part 3. - Management Controls

Prepared in accordance with section 24 of the *Marine Farming Planning Act 1995*. Management controls must contain any measures necessary to manage and mitigate possible negative effects of marine farming operations within the Plan area.

1. *General Controls for all Marine Farming Zones*

There must be no unacceptable environmental impact, to the satisfaction of the Secretary, outside the boundary of the marine farming lease area. Environmental parameters must be monitored in accordance with the requirements specified in the relevant marine farming licence.

2. *Environmental Controls Relating to Carrying Capacity*

- (i) In all new lease areas used for the farming of shellfish there must not be more than the equivalent¹ of either:
 - (a) 1.1 km of stocked racking per hectare of lease area; or
 - (b) 4.4 km of stocked post and wire farming equipment (commonly known as the BST system) per hectare of lease area; or
 - (c) 1.1 km of effective backbone longline per hectare of lease area.
- (ii) In all existing lease areas used for the farming of shellfish there must not be more than the equivalent¹ of either:
 - (a) 1.1 km of stocked racking per hectare of lease area; or
 - (b) 4.4 km of stocked post and wire farming equipment (commonly known as the BST system) per hectare of lease area; or
 - (c) 1.1 km of effective backbone longline per hectare of lease area.
- (iii) Holders of an existing marine farming lease have 5 years from the date of approval of this Plan to comply with 2(ii).
- (iv) Containers of oysters in intertidal lease areas must be clear of the seabed and there shall be no layering of containers on the racking.
- (v) All longlines and associated equipment for filter feeding shellfish must be maintained at least 1 metre clear of the seabed.

¹ For the purposes of 2 (i) and 2 (ii) above each 100 metres of stocked racking shall be deemed equivalent to 400 metres of stocked post and wire farming equipment in circumstances where both systems are used in a lease area at the same time.

3. Environmental Controls Relating to Monitoring

- (i) Lessees must comply with the environmental monitoring requirements specified in the relevant marine farming licence.
- (ii) Lessees are to provide to the Secretary an estimate of numbers or biomass of each species of shellfish being farmed in a lease area for which they hold a marine farming licence, on an annual basis or as otherwise specified in the relevant marine farming licence.
- (iii) Lessees must provide a baseline environmental survey as specified by the Secretary where:
 - (a) a new lease area is being established; or
 - (b) for any expansion greater than 10% to an existing marine farm lease area.

The baseline environmental survey must be undertaken prior to the commencement of marine farming operations.

Note: The Secretary will use the information from the baseline environmental survey to assess whether the area to be farmed contains any rare and endangered species or any unusual habitat and will determine future management and monitoring requirements for the area.

- (iv) Lessees farming or taking bivalve shellfish from the lease area for human consumption or for on-growing for human consumption must comply with the requirements of the Tasmanian Shellfish Quality Assurance Program and with any directions from the Minister for the Department of Health and Human Services.
- (v) Lessees must regularly measure the growth of samples of shellfish, as specified by the Secretary, in areas where the growth rates of shellfish have declined and questions arise over the carrying capacity of a growing area.

4. Abalone Farm Audit

All abalone marine farming is to be conducted in accordance with the DPIWE's Abalone Farm Audit requirements.

5. Chemical Controls

All chemical use must comply with the requirements of the *Agriculture and Veterinary Chemicals (Control of Use) Act 1995*.

6. Controls on Waste

Lessees must dispose of wastes from:

- harvesting;
- processing of produce; and
- removal of fouling organisms,

in a manner that the Secretary is satisfied will not cause an unacceptable effect on the ecology of the marine environment or nearby shorelines.

7. Disease Controls

- (i) Lessees must notify the Secretary of any suspected disease in accordance with the *Animal Health Act 1995*.
- (ii) Lessees must not intentionally release into State waters fish of species authorised in the relevant marine farming licence unless authorised to do so by that licence.

8. Visual Controls

Lessees must ensure that all marine farming structures and equipment on marine farming lease areas conform to the following controls:

- (i) All fish cages, buoys, netting and other floating marine farming structures and equipment on the sea, other than that specified for navigational requirements, must be grey to black in colour, or be any other colour that is specified in the relevant marine farming licence.

Holders of an existing marine farming lease have three years to conform from the date of approval of this Plan.

Lessees of new marine farming lease areas must comply immediately on commencement.

- (ii) Marine farming structures and equipment must be low in profile and be of a uniform size and shape to the satisfaction of the Secretary.

Holders of an existing marine farming lease have three years to conform from the date of approval of this Plan.

Lessees of new marine farming lease areas must comply immediately on commencement.

- (iii) Posts on each section of racking on intertidal lease areas are to be of consistent height above sea level.
- (iv) Row markers on intertidal lease areas are to be of consistent height above sea level.
- (v) The lease area must be kept neat and tidy to a standard acceptable to the Secretary.

- (vi) Floating storage huts, grading facilities and shelters must not be located within a lease area unless authorised under the relevant marine farming licence.
- (vii) Anchors and mooring lines that extend outside the lease area must be at least 5 metres below the surface at the boundary of the lease area.

9. Access Controls

- (i) Lessees must mark the external boundaries of the lease area in whatever manner is required by the Secretary and by the relevant authority under the provisions of the *Marine and Safety Authority Act 1997*.
- (ii) Lessees must identify the lease area in a manner specified by the Secretary.

10. Other Controls

- (i) Lessees must comply with the *Marine Farming Planning Act 1995* and with any other Act or regulations that may affect the lease area or the marine farming operations in that lease area.
- (ii) Lessees must comply with guidelines on noise emissions for marine farming operations made pursuant to the *Environmental Management and Pollution Control Act 1994*.
- (iii) Lessees must maintain marine farming structures and equipment on lease areas held by them in a serviceable condition.
- (iv) Lessees must remove redundant, dilapidated or loose marine farming structures and equipment from the lease area at the request of the Secretary.
- (v) If any part or parts of marine farming structures or equipment break away from the lease area, lessees must take action as soon as reasonably possible to recover those structures and equipment and return them to the lease area or otherwise dispose of them in an appropriate manner.
- (vi) Lessees must ensure any predator control of protected species is conducted with the approval of the Parks and Wildlife Service of the Department Primary Industries, Water and Environment.
- (vii) Lessees must permit the Minister, or persons authorised by the Minister, to enter into and inspect the lease area at all reasonable times.
- (viii) Lessees must comply with all lawful written requirements of the Minister.

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Glossary

CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPIWE	Department of Primary Industries, Water and Environment (NB. DPIF and DELM amalgamated in September 1998 to DPIWE)
MAST	Marine and Safety Tasmania
Phytoplankton	Plankton consisting of microscopic plants
Secretary	Secretary of the Department of Primary Industry, Water and Environment
TSQAP	Tasmanian Shellfish Quality Assurance Program

Species Glossary

Flathead	<i>Platycephalus spp.</i>
Flounder	Family Pleuronectidae
Garfish	Family Hemiramphidae
Gummy shark	<i>Mustelus antarcticus</i>
Great Crested Grebe	<i>Podiceps cristatus</i>
Hooded Plover	<i>Thinornis rubricollis</i>
Oysters, Flat (native)	<i>Ostrea angasi</i>
Oysters, Pacific	<i>Crassostrea gigas</i>
Pied Oysterscatcher	<i>Haematopus longirostris</i>
Seagrass	<i>Zostera muelleri</i>
Seagrass	<i>Heterozostera tasmanica</i>
School shark	<i>Galeorhinus australis</i>