

GEORGES BAY MARINE FARMING DEVELOPMENT PLAN
OCTOBER 1998

(REVIEWED MARCH 2008)
(MODIFIED 20 NOVEMBER 2012)

Some comments expressed in this document have arisen out of discussions with marine farmers in the study area and an examination of departmental files. To the best knowledge of the DPIWE, the views of marine farmers have been correctly incorporated. However, the words describing the operation of each farm in the document are the views of the DPIWE and do not necessarily reflect the views of the operators.

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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 its management.

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. This growth has not followed a specific planning process, individual applications having been processed and developed in an *ad hoc* fashion. The resulting levels of conflicts with other users of the coastal zone has led to the establishment of a zoning system, similar to land based schemes to plan and develop marine farming in the State.

The Georges Bay Marine Farming Development Plan is one of a series of plans which are being prepared for the main aquaculture regions of the State. The Plan identifies areas of coastal water that may be suitable for marine farming, while taking into consideration other users of the coastal zone. This Plan has been developed by an extensive public consultation process in which factors such as the physical suitability of the area, the current legal situation and the desire to minimise impacts on other users of the coastal zone were given consideration.

The Georges Bay Marine Farming Development Plan is in three sections: an environmental impact statement; development proposals including maps of the areas available for marine farming; and management controls and operational constraints affecting activities within the zones.

This Plan identifies five zones in which marine farming may take place. Some of these include existing farms, and some are suitable for industry expansion, providing new sites for shellfish and seaweed culture. The Plan does not propose any zones for the culture of finfish.

Three new zones have been identified as suitable for marine farming. Existing marine farming areas account for the remaining expansion. With the adoption of the Plan, the potential area for marine farming will increase from 40.16 ha to 101.859 ha.

An important outcome of marine farming development plans will be an extensive environmental monitoring program to ensure that the industry operates in an environmentally sustainable way. This undertaking will ensure that the plans fit

within the broad definition of "sustainable development", a key component of the State's Coastal Policy.

Environmental Impact Statement

The Environmental Impact Statement describes the area covered by the marine farming development plan, including an outline of existing marine uses and existing industry operations. The impacts of marine farming on other users and values in the coastal zone have been considered in the placement of zones. Impacts on land under the control of local councils and marine boards have also been considered with those authorities to ensure a co-ordinated approach to development in the coastal zone.

A baseline environmental survey has been conducted, within zones where marine farming does not currently occur, to collect relevant environmental data to assess the suitability of proposed sites for marine farming activities. This is to ensure that areas recommended for marine farming are suitable for this purpose, based on all the available information. It is also to ensure that areas of ecological significance or areas that appear sensitive to disturbance are not subjected to the possible impacts of marine farming. This information will also be used to determine the requirements for collection of further baseline environmental information prior to the commencement of marine farming.

The general impacts of marine farming are outlined here, including ecological as well as other impacts. To reduce these impacts, controls on activities within the zones have been developed. These are outlined as management controls and accompany the marine farming development plan. In some zones there may be impacts specific to that zone; these are included in the zone description.

The impact statement also includes a detailed description of the zone area available for marine farming.

I. General Introduction

Georges Bay is situated on the east coast of Tasmania, centred on 41°19' south, 147°17' east. The area is 285 km from Hobart the State's capital city, a journey of approximately three hours by road. It is about 170 km from Launceston, a journey of approximately one and a half hours by road. The township of St Helens is located on the western shores of Georges Bay. The area included in the Plan is shown in Map I.

The Plan area includes all the waters of the Georges Bay estuary including Moulting Bay, the location of four existing marine farming leases. The north eastern boundary of the Plan area is defined by a line drawn between St Helens Point and Grants Point.

2. Characteristics of Georges Bay and Moulting Bay

a) Geographic Description

The Georges Bay and Moulting Bay estuaries cover an area of approximately 1788 ha with a coastline of approximately 35 km. The estuaries are fed by a number of rivers and creeks, the largest being the George River with a catchment area of about 405 km². Other minor rivers include the Golden Fleece Rivulet and Boggy, Colchis and Higginbothams creeks. The estuary joins the Tasman Sea at the eastern boundary of Georges Bay through a relatively shallow and narrow opening over a continually changing sandbar known as the St Helens Barway.

The coastline on the eastern side of Georges Bay is predominantly saltmarsh and mudflats giving way to coastal dunes. The southern section of the Bay is a mixture of cliffs and beaches of coarse sand and mud and includes extensive holiday house and residential development. Soils in this region are deep and consist of unconsolidated sand over medium to heavy clays. The south western portion of the Bay consists of flood plains and river flats of the George and Golden Fleece rivers and supports the central business district of St Helens. To the north, the Bay is surrounded by hilly undulating country on granite with a coastline of coarse to medium sand beaches punctuated by granite outcrops

The township of St Helens is located on the westernmost coastline of the Bay. The estuary is surrounded primarily by private freehold land on the western and south western sides, and state recreation areas on the north eastern and south eastern sides.

The temperate climate of the Georges Bay area is maritime influenced. The mean maximum temperature in summer ranges between 21°C and 23°C, and in winter ranges from 13.6°C to 14.4°C. The lowest temperature recorded in winter is -4.3°C, with the highest recorded summer temperature being 39°C. Generally the climate on Tasmania's east coast is mild with extremes in temperature less common due to its maritime location. There are also fewer winter frosts and fewer hotter days compared with inland areas.

Water temperatures in Georges Bay and Moulting Bay are generally highest in late spring and summer and lowest in winter. Recorded temperatures range between 4.8°C and 22.1°C.

The area has a mean annual rainfall of 780.7 mm with the highest falls usually occurring during winter. However, the mean monthly rainfall is relatively consistent throughout the whole year.

b) *Social and Economic Description*

The area is serviced by St Helens, the largest settlement on the east coast of Tasmania and the only major town adjacent to the coastline of Georges Bay. St Helens is located on the western boundary of the Bay. The population is approximately 2 600 including the Akaroa and Stieglitz areas. However the area is popular for vacations and it is estimated that its population increases to approximately 10 000 during the summer months.

Population trends for St Helens are shown in Table 1. Over the 15 year period 1976-1991, the population of St Helens township increased by 328 people, representing a population growth rate of 40.1% or an annual average growth rate of 2.6%. However, the growth ceased between 1986 and 1991. It would appear that growth has been much more rapid recently in the neighbouring areas of Akaroa and Stieglitz.

Settlement	Population 1976 (Persons)	Population 1981 (Persons)	Population 1986 (Persons)	Population 1991 (Persons)	Population Change (%) 1976-1991
St Helens	817	1005	1149	1145	40.1%

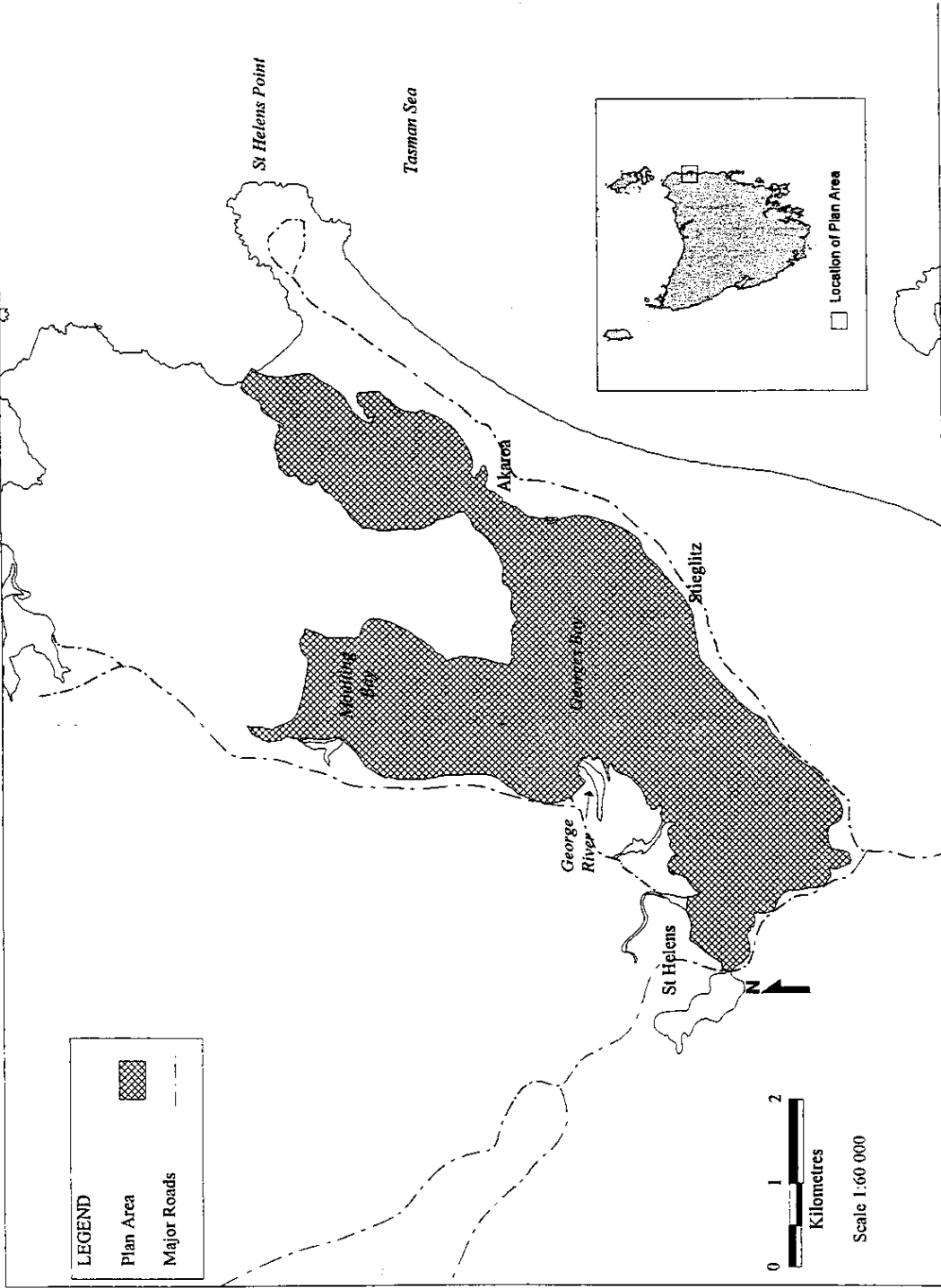
Table 1: Population trends in St Helens

Source : ABS Urban Centre and Localities : Tasmania Cat No 2794.6

Unemployment levels for the area are above the State average, the current estimate being 16.1%.

Historically the main sources of employment were mining, tourism, timber milling and commercial fishing. Tin was discovered in 1874 and mines were developed all over the Blue Tier in the following twenty years, with the product being shipped through St Helens. Mining declined from the turn of the century and it was these out of work miners that became the fishermen, shopkeepers and builders of St Helens. (Burns 1993)

Map 1 - General Map of Tasmania and the Plan Area



The St Helens/Georges Bay area was frequented by communities from surrounding areas such as Fingal and the Midlands as a holiday and recreation area from its early days. During the 1920s a tourism industry began to develop in the St Helens area, and the first coach tours to occur in Tasmania passed through St Helens in the 1960s. (Burns pers comm). Currently the area has 15 properties, including caravan parks, offering accommodation totalling 238 rooms or sites, sleeping 863 persons. (Tourism Tasmania).

By 1945 cray fishing was becoming an important industry. Then in 1974 scallop beds were discovered off the coast of St Helens. Up to 187 boats worked this fishery, the majority landing their catch in St Helens. During the height of this fishery, St Helens had three facilities licensed to process scallops, and some 700 bags were processed daily during the season. The scallop fishery was in decline by 1984 and was replaced to some extent by an orange roughy fishery located off St Helens known as "The Hill". About 132 boats once fished the area, and 8 to 10 landed catch in St Helens. This fishery, however, has also declined.

Fishing and tourism still remain important industries for the area. Currently the majority of persons are employed in retail/wholesale business, commercial services and agriculture.

3. Existing Marine Uses

There is a range of maritime uses within the Plan area including navigation, commercial fishing, marine farming, recreational fishing and boating, diving, sailing/wind surfing, waterskiing and other recreational activities.

During the preparation of this Plan Georges Bay was under the control of the Marine Board of Hobart (MHB) which specified the navigation channels identified within this Plan.

In July 1997 control of the area was transferred to Marine and Safety Tasmania (MAST) under the *Marine and Safety Authority Act 1997*. MAST have indicated agreement with the navigation channels identified by the MBH. These are shown in Map 2. The principal navigation channel runs from St Helens north east to the entrance of Georges Bay at Dora Point and is marked by MAST navigation pylons. This channel is regularly used by commercial fishers, recreational boaters and yachties throughout the year. Another recognised navigation channel exists between the launching ramp at Stieglitz Beach and the MAST pylon 8A.

Historically the port of St Helens has been based around commercial fishing and it is still the largest fishing port outside Hobart, with three locally based processors and approximately 60 vessels landing product there. In 1995-96 there was approximately 260 tonnes of scalefish landed at St Helens, the major species being blue eye trevalla, warehou, Australian salmon, banded morwong, stripey trumpeter and shark. Rock lobster, giant crab and scallops are also landed at the port.

There are currently two commercial netting endorsements within Georges Bay, though one is not in use. The holder of the other endorsement regularly fishes the bay, the main species sought being flounder. These licences are non-transferable and will lapse when the current holders cease to fish.

Harvesting of the endemic native oyster, *Ostrea angasi*, has occurred in Georges Bay. In a report to the Royal Commission on *The Fisheries of Tasmania in 1883* it was stated that 44 700 bags of oysters, or 22.5 million oysters, were dredged annually in the southern and south western waters of the State in the decade 1860 to 1870, a percentage of which came from Georges Bay. In 1991 a survey of native oyster stocks in Georges Bay was undertaken by the DPIF, which estimated that there were approximately 24 million flat oysters in excess of 50 mm in the Bay. More recently there has been regulated harvesting of native oysters in Georges Bay, the most recent being in 1995 by six licensed divers. This wild fishery is currently under review.

It would appear that the intense dredging of native oyster beds during the mid-1800s led to a deterioration of the fishery. In 1884-85 three reserves were established by the Government around the State to protect and maintain breeding stocks of native oysters. The success of these reserves led to the establishment of marine farming leases around the State and by 1887 there were 33 established native oyster farms, two within Georges Bay.

There are four persons with permits to commercially harvest clam species that occur within Georges Bay. The two species most commonly harvested are *Katylesia spp.*, usually harvested from shallow intertidal areas, and *Venerupis spp.*, usually harvested from deeper subtidal waters. Areas identified as important commercial harvesting sites for *Katylesia spp.* include sandflats adjacent to the Humbug Point State Recreation Area and to St Helens Point Recreation Area. Significant areas identified for *Venerupis spp.* include beds to the south of navigation pylons 8A, 8 and 6.

The St Helens area has been used for recreational pursuits since white settlement. This has continued to present times and is reflected by the number of holiday homes

in the area and absentee ratepayers, estimated to be approximately 30% of total ratepayers.

Recreational fishing occurs over much of the Plan Area with some of the more popular areas identified including the waters surrounding pylons 2, 11 and 13, waters off Humbug Point and Yellow Bluff and deepwater areas off Stieglitz Beach. Recreational fishing is also popular from a number of jetties surrounding the Bay. Catches include flathead, garfish, flounder and cod. Gill netting is often used to catch salmon and flounder. Flounder spearing and prawning is also practised in the shallows within the Bay. There are currently no marine reserves within the Plan Area, but a number of restrictions apply to recreational and commercial fishing:

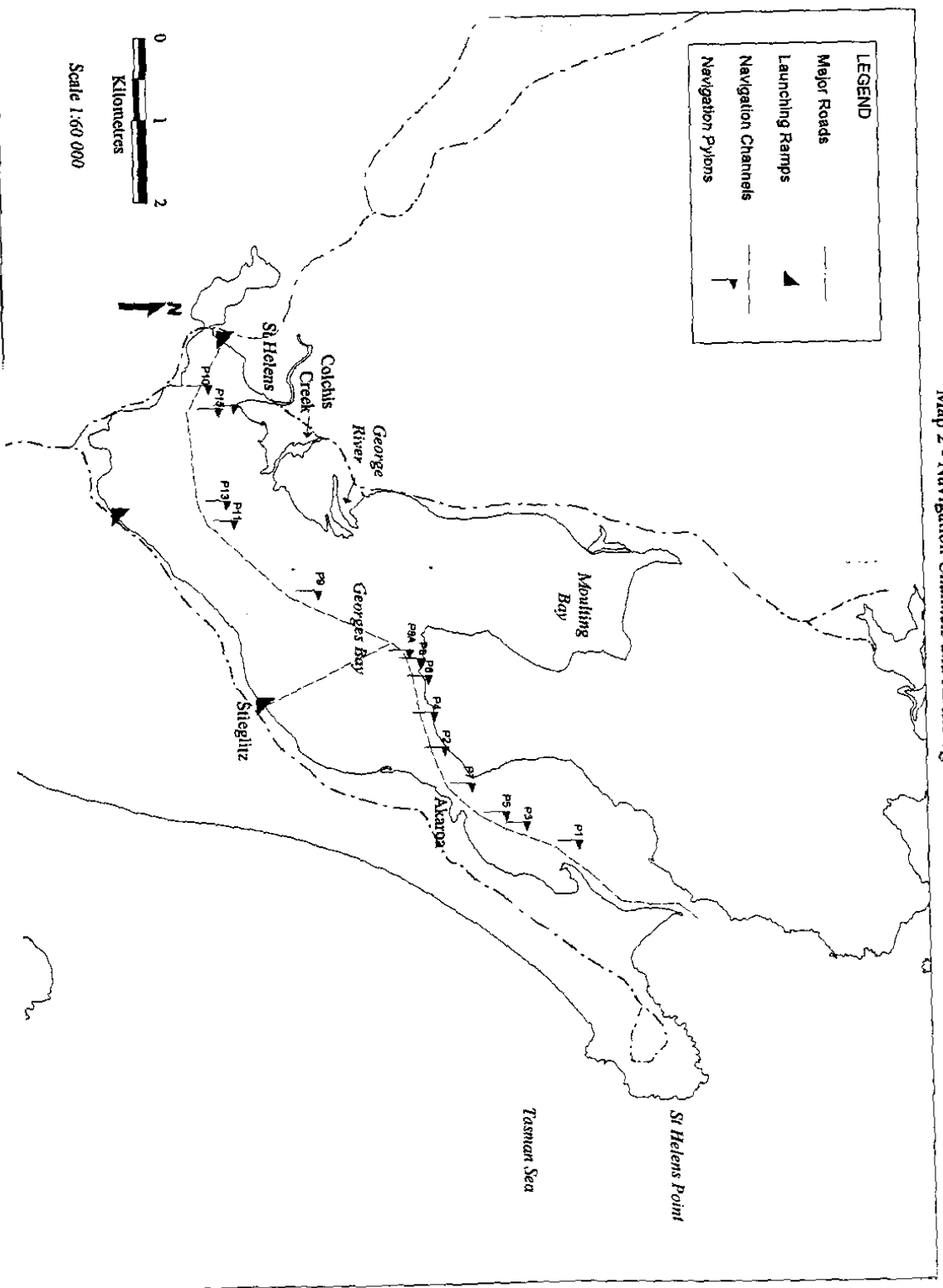
- no school (snapper) or gummy shark can be taken within Georges Bay, which has been declared a Shark Nursery Area;
- crayfish pots may not be used west of the entrance to Georges Bay; and
- there is a declared no netting area westward from a line extending from the eastern end of the bridge crossing Colchis Creek on the northern shore to No. 15 beacon (Green), thence to a point on the southern shore commonly known as the Sea Scout launching ramp.

The locations of known boat launching ramps in the Plan Area are shown in Map 2. Constructed launching ramps exist at St Helens, O'Connors Beach and Stieglitz Beach.

Power boat racing occurs occasionally in the waters adjacent to O'Connors Beach. MAST has a designated waterskiing area that runs from the launching ramp at O'Connors Beach to Stock Yard Flats and is located approximately 500 m from the shores of Stieglitz Beach. It would appear that waterskiing also occurs in other areas of the Bay depending on the wind direction; these areas include waters off Beauty Bay, O'Connors Beach, Stieglitz Beach and north and east of Humbug Point area.

Dive charters available in St Helens usually occur outside Georges Bay. However when weather conditions prevent this, the charters occur within the Bay. Diving areas identified by a charter operator include Lords Point, the Training Wall at the entrance to Georges Bay and Dora Point. Diving instruction also occurs within the Bay.

Map 2 - Navigation Channels and Anchorages in the Plan Area



MAST has a scheduled area under the *Marine and Safety Authority Act 1997* known as a fishing and swimming only area, located in the waters adjacent to the coastline, running from O'Connors Beach, east and adjacent to Stieglitz Beach and finishing at Stock Yard Flats. There is also another recreation area from Possum Tom to Beauty Bay. Sandy beaches used for aquatic and beach activities in the area include areas west of Clerk Point, Wilsons Bay, Moulting Beach, a number of areas to the east of Beauty Bay, O'Connors Beach, Stieglitz Beach and areas around Akaroa.

There are currently no identified yacht clubs associated with Georges Bay. There is however a Sea Scouts Club located at O'Connors Beach, which regularly uses Georges Bay for its activities. MAST has designated a sailing area off O'Connors Beach. Sailing activities generally occur in waters in the western section of Georges Bay through to the mid regions of the Bay for some of the larger yachts. Sailing also occurs in the water adjacent to the launching ramp at Stieglitz Beach and in waters off Bayview.

Sailboarding is a popular pursuit in Georges Bay, with sailboarders travelling from the north west coast and Hobart to sail. Sailboarding areas depend on wind direction and strength. Identified areas include runs from the sewage treatment works at St Helens to navigation pylon 11 in the waters adjacent to sandbars in the area, O'Connors Beach, north to pylon 13, from O'Connors Beach north east to navigation pylon 9, from Stieglitz Beach to navigation pylon 8 and from Humbug Point south west to north of the George River mouth and Bayview.

4. Marine Farming in the Plan Area

a) Suitability for Marine Farming

The area covered by the Georges Bay Marine Farming Development Plan is highly suited for some marine farming activities. Its advantages are:

- water temperatures are suitable for the production of shellfish;
- there is no history of marine farm closures due to toxic dinoflagellate blooms;
- it contains intertidal areas suitable for the culture of oysters. For a number of reasons these are becoming extremely scarce in the State;
- this region is already established as a significant marine farming area for the State; marine farming experience has now evolved and there is a good working knowledge of the local environment;

- there is a skilled labour force available in the region, and the local industry is well placed to adapt to modern technology and farming practices; and
- there are few major sources of pollution that could threaten the industry.

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

- the need to minimise the effects of marine farming operations on other user groups, given that the area has a wide recreational usage; and
- the need to minimise conflicts with existing land use activities, including tourism and recreation, and agricultural and residential activities.

b) *Existing Marine Farms*

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

There are four marine farming leases within Moulting Bay, covering an area of 40.161 ha. These existing farms are shown in Map 3.

Location	Farm No.	Zone No.	Lease Holder	Business Name	Size (ha)	Lease Grant	Lease Expiry
Moulting Bay	9	4	St Helens Oysters P/L	St Helens Oysters Pty Ltd	13.67	1990	2010
Moulting Bay	27	5	Mr A Flintoff	Mack Aquaculture	7.0	1983	2003
Moulting Bay	65	4	Locklow Nominees P/L	Locklow Nominees Pty Ltd	16.49	1984	2004
Moulting Bay	144	5	Mr J H Harris	Tas East Coast Mussels	3.001	1991	2011

Table 2 - Details of Existing Marine Farm Leases in the Georges Bay Moulting Bay areas.

Holder	Location	Zone	PO	FO	MU	CLM
St Helens Oysters Pty Ltd	Moulting Bay	4	0	0	0	
Mr A Flintoff	Moulting Bay	5	0	0	0	0
Locklow Nominees Pty Ltd	Moulting Bay	4	0		0	
Mr J H Harris	Moulting Bay	5	0		0	

Holders of a marine farm lease or permit in the region, location description, species licensed to grow (x = licensed to grow but not growing at present) and indication of

the species actually grown on the marine farm (o = licensed to grow and growing at present). List of species name abbreviations:

PO	Pacific Oyster
FO	Flat Oyster
MU	Mussel
CLM	Clams

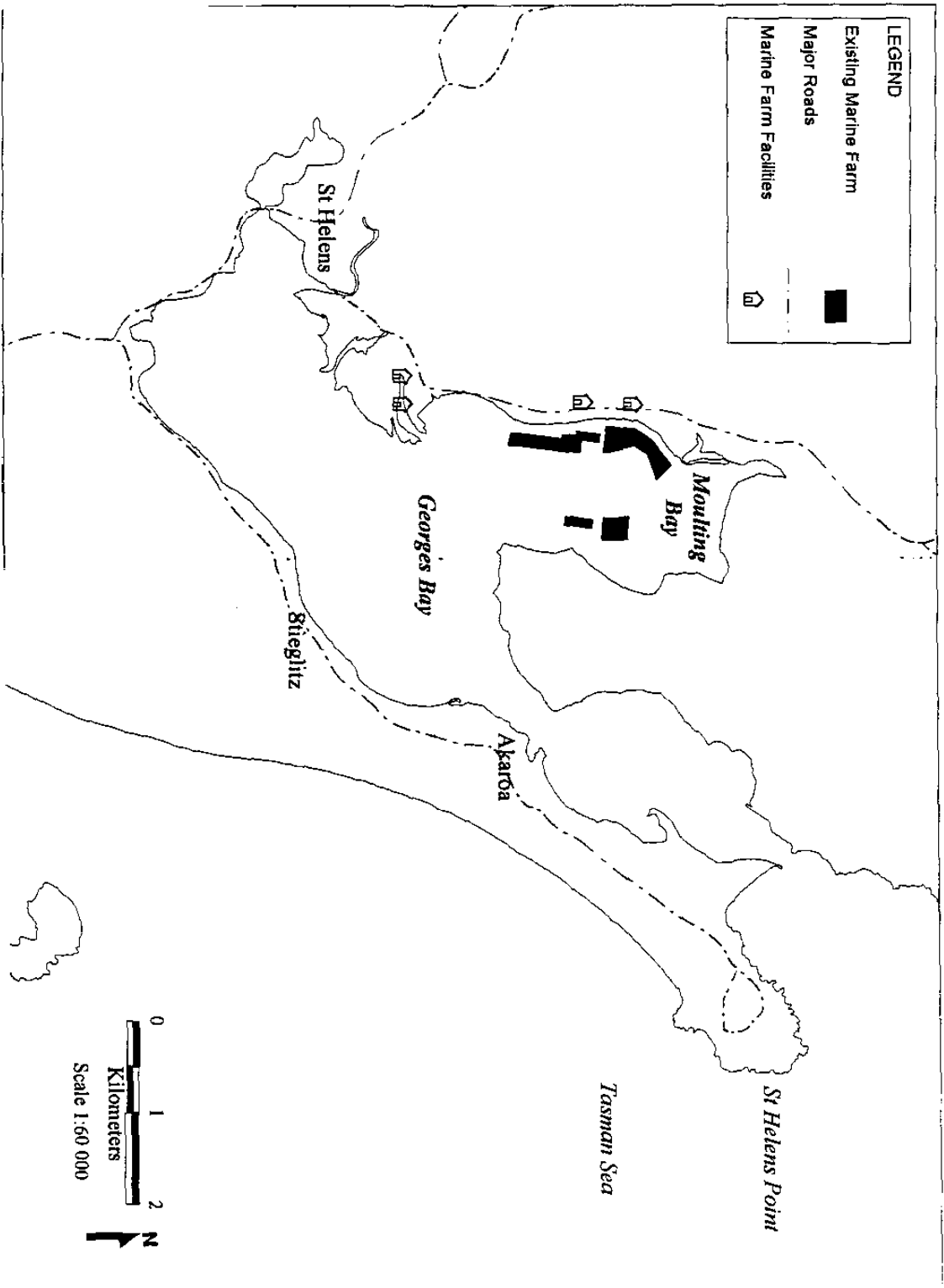
Table 3 - Species Licensed at Existing Marine Farms in the Plan Area

c) Existing Infrastructure and Service Facilities

The marine farming industry in the area covered by the Georges Bay Marine Farming Development Plan is serviced by a well developed infrastructure. There is a range of developments, from jetties and packing sheds to offices and workshops, associated with the marine farms. Due to the nature of the shellfish species grown and the advantage that this product may be packed and transported live and fresh to markets, there is currently no major processing of farmed shellfish in the area. Four onshore facilities, in two areas, are used to service the existing marine farming leases:

1. Moulting Bay Sheds and jetty
2. McDonalds Point area Sheds and canal

Map 3 - Marine Farms in the Plan Area and Existing Facilities



5. General Impacts of Marine Farming

The impacts of marine farming vary in their nature and intensity. There are the obvious 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. These impacts are relatively easily controlled.

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 a farmed 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, Ritz *et al.* 1989). There has been some limited research on the impacts of shellfish culture on the local environment. These impacts are divided into 'ecological' and 'other'.

Shellfish

Shellfish feed on microscopic algae (or phytoplankton) and detritus obtained from the waters they are growing in. They do not require feeding. Even so, shellfish farming results in the build-up of some excretions below the holding containers on racks or longlines. However, much of this is dispersed by currents, and it has not been found to be a significant problem in the history of the industry in Tasmania.

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. This is naturally also of concern to shellfish farmers since, if the food supply is limited, the shellfish will grow more slowly. Management may be adjusted by marine farmers in relation to food availability, for instance by altering stocking density or row spacing. The Georges Bay Marine Farming Development Plan contains management controls limiting the amount of racking or longlines per ha and hence the density of shellfish.

The Department of Primary Industry and Fisheries (DPIF) conducted a study on Predictive Modelling of Carrying Capacities of Oyster (Pacific Oysters) Farming Areas In Tasmania (Crawford *et al* 1996). This research aimed to develop predictive models of the maximum density of oysters that could be cultured in a growing area without negatively affecting the oyster growth rates. Although Georges Bay was included in this study, the predictive model has only been developed for Pittwater. Data on the hydrodynamics and nutrient levels of Georges Bay and Moulting Bay,

however, were collected. They indicated that Georges Bay excluding Moulting Bay has a high tide volume of approximately 115 million m³ with a flushing time of 10 tidal cycles or about 5 days. Moulting Bay has a high tide volume of approximately 21 million m³ and an exchange rate with Georges Bay estimated to be 17.5% per tidal cycle. Thus, although the entrance to Georges Bay is narrow, the exchange rate of water between Georges Bay and the ocean is reasonably high, allowing for regular renewal of algal food in the water. Data collected on nutrient and chlorophyll a concentrations in Georges Bay showed that generally Georges Bay has similar concentrations to other oyster growing areas in the state, but dense algal blooms occur periodically. These algal blooms are thought to be triggered by the influx of nitrates and phosphates from on-land activities.

The production of oysters per hectare from Moulting Bay of 4.4 million per annum from 40.5 ha. in 1995/96 is lower than other oyster growing areas such as Pipeclay Lagoon which produced 8.2 million oysters per annum from 48 ha, but higher than , for example, 6.2 million oysters from 118 ha at Pittwater and 3-4 million oysters per annum from 80 ha at Little Swanport. The data on water movements and exchange rates in Georges Bay and the nutrient and chlorophyll a concentrations indicate that the carrying capacity of the system has not been reached and some controlled expansion of marine farming in the area could occur.

The establishment of new Pacific oyster farms around the State could lead to an increase in the spread of oyster spat settlement, given favourable temperature, salinity, currents and substrata. 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.

In Tasmania Pacific oysters spawn during the warmer summer months when water temperatures rise above approximately 18°C for several consecutive days. 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 the right 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. It is unclear when Pacific oysters were first introduced into Georges Bay, but they were present on the foreshore at the entrance to Medeas Cove in 1971 (C Sumner, pers comm.). Anecdotal reports also suggest there had been settlement of Pacific oysters in other areas of Georges Bay prior to the allocation of

marine farm leases. The first marine farming lease in the area was allocated in 1975. Since the time of the first introduction and marine farming of Pacific oysters there have been a number of areas within Georges Bay where spat settlement has occurred on suitable substrata.

There have not been any studies undertaken in Tasmania regarding 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 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).

Pacific oysters that have settled within Georges Bay and Moulting Bay represent a potential commercial opportunity for wild harvesting. The Department of Primary Industry, Water and Environment (DPIWE) intends to progress this financial opportunity and has developed a policy relating to the harvesting of wild Pacific oysters. This policy has been developed in consultation with the Tasmanian Aquaculture Council and Department Health and Human Services (DHHS). Any such harvesting will only occur under the specific guidelines of the DPIWE policy and Tasmanian Shellfish Quality Assurance Program (TSQAP). Any harvesting that occurs in Georges Bay would have the added benefit of removing some of these wild Pacific oysters. This would be welcomed by those sections of the community who perceive them as a nuisance.

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 existing plankton and particulate organic matter. Also, the marine farming management controls introduced in Tasmania restrict the density of shellfish held on farms by limiting the amount of racking or longlines per ha, and thus the sediment deposits are much less than for high density mussel farms overseas. Moreover, shellfish can have a beneficial impact in highly eutrophicated 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).

Within Georges Bay and Moulting Bay there are limited seagrass beds, with the predominant species being *Heterozostera tasmanica* and *Zostera muelleri*. The impacts of marine farming activities on the surrounding ecological communities, such as

seagrass beds, have not been specifically documented and anecdotal evidence is contradictory. In some areas where marine farms have been sited over or adjacent to seagrass beds, the beds have increased, but in other areas they have shrunk. Anecdotal evidence suggests that seagrass beds may be increasing in some sections on the bays.

The cumulative effects of marine farming on water quality in the area of the Marine Farming Development Plan are difficult to distinguish from the effects of on-land developments taking place over the same period. Many aspects of water quality are affected directly by on-land activities, and until there is a comprehensive analysis of all impacts, the sources can not be distinguished.

Chemicals

Intertidal shellfish farms generally use wooden racks treated with preservatives, but these preservatives have not been found to accumulate in shellfish. There are no chemicals used in the rearing of shellfish.

Operational Wastes

Some aspects of the farming operations may affect water quality, such as fouling organisms from in-water equipment being disposed of, and decomposing, in the water. Similarly, wastes from harvesting and processing operations could result in substantial organic build-up if they are thrown back into the water.

Diseases

Bonamia, a small protozoan parasite, was detected in Georges Bay in 1992 in the native oyster, *Ostrea angasi*, population. The disease is known to cause mortalities in native oysters and has in fact virtually wiped out large sections of the European flat oyster industry since it was first discovered in the late 1970s, although the strain found in Tasmania is thought to be different to the European strain. *Bonamia* is considered to be endemic to Tasmanian waters and does not infect Pacific oysters.

a) *Visual Impacts*

Farming Equipment

Marine farming equipment in coastal waters, as with any structures on the water, will have some visual impact on residents and other users of an area. This equipment will generally consist of, buoys, racking, navigational markers and so on. The siting, layout, colour and general appearance will affect their visibility and acceptability.

On-land developments associated with marine farming will also have a visual impact; these developments are under the control of Department of Primary Industries, Water and Environment (DPIWE) and or the local government authority.

Lighting

The impact of lighting used on a marine farm will vary with the type of farm and the marking requirements of the relevant Marine Authority. There may be navigation lights on the corners of the lease or spotlights for security.

Poor placement of high-intensity lights can have a considerable impact on the amenity of nearby residents, or even on residents a considerable distance away. Flashing navigation lights are required to be visible from considerable distances under maritime laws, and may be intrusive to some people. The reflective surface of calm waters could exacerbate light problems.

General Appearance

The general appearance of marine farms will vary with the species farmed and the management strategies of the operator. Intertidal shellfish farms will typically not be highly visible, except at low to medium tides when racks emerge. The visible part of deep-water shellfish leases will usually consist of parallel rows of buoys within a marked lease area.

b) Access Restrictions

Navigation

Marine farming equipment on the water, as with any floating structures, will have some impact on the navigation of vessels (mainly fishing and recreational) in an area.

Other Restrictions

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 rights of recreational fishers, divers and swimmers who may have previously used 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.

c) Other Impacts

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 things as movement of boats, routine procedures in working of the lease and human activity.

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.

Predator Control

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

d) Predicted Impacts of Increased Marine Farming in the Plan Area

Knowledge of the environmental impacts of marine farms in Tasmania is limited for most farms, with no baseline measurements dating from before the introduction of the existing farms. However, baseline environmental information has been collected for new farming areas outlined in this plan. This information is presented in the zone descriptions.

Studies by the DPIF on the carrying capacities of the area, and the DHHS TSQAP program, have assisted with the prediction of impacts of marine farming in the area.

Other impacts from marine farming in the area include visual impact, changes to the general amenity of the areas, impact on other water users and the social and economic impacts. Generally, the social and economic impacts in the area are considered positive, with increases to employment having important flow-on benefits. However it is recognised that there may be changes to accepted uses of some areas of water as a result of marine farming, including access to areas of coastal waters.

Ecological changes that may take place as a result of increased marine farming are difficult to predict accurately. However, one of the significant physical characteristics of these water areas is their relatively high rate of water exchange through tidal flushing, and this is expected to minimise the impacts.

Any changes to the physical characteristics of sediments due to increased marine farming should remain localised, and are expected to be similar to local and overseas experience. The monitoring program to be initiated by the DPIWE should give a clearer indication of the impact of the existing industry and of changes that

can be expected after an increase in production. It will also allow appropriate and timely response to detected changes.

As with the prediction of any impact on the environment, there are limited guarantees. But there is a range of management controls for marine farming that can mitigate or ameliorate the predicted impacts. Marine farmers in the Development Plan area will be required to comply with these controls. The management controls include provisions for collecting baseline environmental data and implementing on-going monitoring programs. These controls should make it possible to detect changes to the marine environment as a result of marine farming in sufficient time for management to be effective.

NOTE: The Georges Bay MFDP October 1998 was modified in 2012 following a review of the plan in 2008. 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 *Development Proposals* of the plan in Table 4 – *Summary of Zones*, zone summaries and Maps 4 to 7.

All other information contained in *Development Proposals* is from the original Georges Bay MFDP October 1998 and should be considered in that context.

Development Proposals

I. Marine Farming Zones

The planning process has identified five marine farming zones in the Georges Bay area. These are shown on Map 4.

The four existing marine farm leases cover a total area of 40.161 ha. Two leases are located in intertidal waters, occupying an area of 30.16 ha. The species currently licensed for these two leases include Pacific oysters, native oysters and mussels. The remaining two leases are deepwater areas occupying an area of 10.001 ha. and the species currently licensed to farm include Pacific oysters, native oysters, mussels and clams.

The Plan has identified five areas suitable for zoning for the purpose of marine farming. Some of these areas have existing farms and others are recognised as being suitable for the expansion of the industry, providing new sites for shellfish farming using both intertidal methods and subtidal methods. The Plan has not identified any zones suitable for the culture of finfish.

Maximum leasable areas have been set for each zone. These indicate the maximum area that will be available for marine farming within the zone. For some zones the maximum leasable area will closely reflect the total area of the zone, with allowance made for securing of longlines as all marine farming equipment is to be included within the zone boundaries. In some zones the maximum leasable area has been restricted by physical parameters and recognition of the interests of other marine activities.

Zones enclosing the existing intertidal shellfish leases generally reflect the boundaries of the existing leases. A marine farmer may apply for an increase in the existing lease up to the maximum leasable area, in accordance with environmental and operational controls as outlined in management controls and licence conditions. There may be opportunity for a new marine farm within the zone provided that the total leased area in the zone does not exceed the maximum leasable area.

In areas where there are new zones created, experience to date has allowed a maximum leasable area to be set. The initial area to be farmed will be allocated after environmental baseline assessment. The initial size of the area allocated will be related to the results of this assessment, the species to be farmed and the proposal outlined by the prospective marine farmer.

Zone areas are sufficient to allow all marine farming equipment to be within the boundaries of the zone. There will be a percentage of some zones which is primarily occupied by mooring ropes and this will vary according to water depth, currents, tidal flow and the mooring system employed by the marine farmer. This generally means that the deepwater zones may appear much larger than the maximum leasable area. The areas outside the marine farm lease but within the zone boundary act as a "buffer" area within which there is public access.

Identifying the species that may be farmed in any area has not been limited to those presently being farmed with the Plan allowing for possible new species to be included. Species to be farmed have not been identified but have been included in the broad categories of shellfish and seaweed. However, as stated already, the Plan does not consider Georges Bay to be suitable for finfish culture.

The establishment of a new zone outside those presently outlined in this Plan, will require the collection of suitable environmental data. This information will be used to support a submission to include a new zone within the area covered by the Plan; any such submission will be subject to the statutory process in accordance with the *Marine Farming Planning Act 1995*. This may allow new zones to be established in the future to accommodate changes that have not been foreseen in the lifetime of this plan.

2. Zone Plans

The zones identified in the Georges Bay Marine Farming Development Plan are summarised in Table 4.

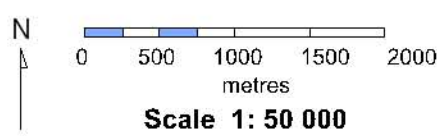
Zone	Area	Species	Zone area (ha)	Maximum Leasable area (ha)	Existing lease area (ha)
1	Hodgmans spit	Shellfish, seaweed	31.00	25.00	0
2	East McDonalds Point	Shellfish, seaweed	24.49	10.00	0
4	Moulting Bay West	Shellfish, seaweed	31.43	30.16	30.16
5	Moulting Bay East	Shellfish, seaweed	19.76	16.00	10.001
6A	South West Pelican Point	Shellfish, seaweed	12.40	12.40	0
6B	South West Pelican Point	Shellfish, seaweed	8.299	8.299	0
Total			127.379	101.859	40.161

Table 4 - Summary of Zones



not-validated for survey

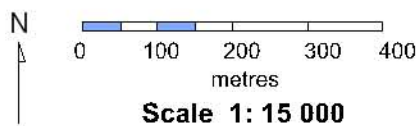
1 centimetre represents 500 metres
Horizontal Datum : MGA 94 Zone 55
Prepared by Marine Resources -




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 Zone	
Environmental data point	

Zone I (Hodgmans Spit)

Location

The zone is situated on the western side of Georges Bay, on mudflats located between the mouths of the George River and Colchis Creek. Hodgmans Spit is situated on the north eastern boundary of the zone. Grannys Gut, a shallow channel running through the mudflats, is located approximately 300 m to the south of the zone.

The surrounding foreshore is coastal reserve consisting of saltmarsh wetlands giving way to private freehold land zoned Rural A with a covering of improved pasture.

Environmental Conditions

Water depth within the zone is generally less than 2 m. Water temperatures have been recorded at the mouth of the George River, approximately 350 m to the north of the zone, and have been found to range from 4.8°C to 19°C with a salinity range of 6.5 ppt to 35 ppt. Representative sediment grab samples were taken in the area; the approximate locations of which are indicated on Map 5. A video recording was taken of the bottom in the northern region of the zone. Results of the sediment samples and a description of the video footage is provided below.

Sediment Samples

Site No.	Description of sediment type, colour & texture
1	Sediment grab collected from a clear area within patches of weed. Much shell grit/debris - predominantly clams, cockles and mussel shell fragments. Fine sand, black in colour.
2	Sand (black) and mostly shell grit. Much shell debris (clams, cockles, flat oysters). Small ascidians attached to some shell debris. There was also a relatively thick covering of brown filamentous algae over the shell debris.
3	Black sand with much shell grit/fragments. No smell detected. Some pieces of <i>Heterozostera tasmanica</i> (parts of rhizome and blades) as well as brown filamentous algae.
4	Predominantly shell debris with some sand (black), no smell. Brown algae with brown filamentous algae over-growth.
5	Sample collected from southern side of sand bank located near this corner

of the zone. Several grabs were taken with the following being collected; a large live pacific oyster (*Crassostrea gigas*), several small brown holothurians, flat oyster (*Ostrea angasi*) shell with *C. gigas* attached, flat oyster valves with small single ascidians attached, fragments of *Heterozostera tasmanica* and *Codium fragile*.

Vertical Video Drop and Drift

Description of bottom type

Sand bottom black/grey in appearance with much shell debris, patchy "low" weed with over-growth of brown, fine filamentous algae.

N.B: This footage was reasonably representative of bottom type observed for most of the area covered while surveying the zone.

The zone is a new marine farming area and will require the collection of further baseline environmental data prior to any future development.

Existing Farming Activities

There are no existing marine farm leases within the zone.

History of Marine Farming Activities

There is no history of marine farming activities within the zone.

Future Potential

The zone is considered to hold potential for the cultivation of intertidal shellfish. Results of the DHHS monitoring, under the TSQAP, indicate that the George River is a significant source of faecal contamination following rainfall. This Department has indicated that any future marine farming operations within this zone would have a 'restricted' classification under the TSQAP. Such a classification will restrict the cultivation of shellfish to a maximum shell length of 50 mm.

It is considered that even with such a restriction on this zone, the area holds potential for marine farming activities. A number of farms around the State rely on juvenile Pacific oysters, reared using intertidal farming methods, for on-growing in subtidal waters. Oysters grown within Zone I would assist in filling what is a growing industry need.

Navigation Channels

The zone consists of shallow mudflats and is clear of any recognised navigation channel. There is a shallow channel known as Grannys Gut to the south of the zone, used by mariners to navigate to an inlet in the adjacent coastline. The Plan recognises the use of this channel and has maintained a distance between the channel and the southern boundary of the zone of approximately 300 m which will allow unrestricted use of this channel.

Marinas, Public Jetties and Other Public Facilities

There are no marinas or public jetties adjacent to the zone.

Surrounding Land Use

The adjacent foreshore consists of coastal reserve giving way to private freehold land, zoned Rural A. The coastal reserve is generally saltmarsh wetlands, with the private freehold land consisting of improved pasture.

There is one residential dwelling on the property, known as “Pelican Point”, adjacent to the zone. The owner of this property has indicated he has a number of plans to develop the area as a retreat for wheelchair and cancer remission patients and as a parrot breeding area, with the view to tourism development. The land holder also intends to build and run a glass bottom boat for marine observation.

Sewage and Stormwater Outlets

The outfall for the St Helens sewage scheme is approximately 1.5 km to the south west of the zone. The scheme is located off the Binalong Bay Road and consists of two ponds for primary and secondary treatment. Secondary treated, unchlorinated effluent is discharged approximately 100 m from the coastline, within Georges Bay.

The sewage scheme has undergone an Environmental Improvement Program (EIP) regulated by DELM. The EIP required Council to improve the management of the St Helens sewage lagoon plant and monitor its performance so as to optimise its operation within the constraints of its present design and investigate reuse options. National Heritage Trust funding has subsequently been secured for the Council’s proposal to reuse the wastewater onto agricultural land and remove the present discharge from Georges Bay. The sewage outfall continues to be monitored under TSQAP. Monitoring results indicate that sewage discharge is not a problem to the existing marine farming within Georges Bay.

The one residential dwelling adjacent to the zone has approval for septic tank sewage treatment.

Summary of Zone

The Hodgmans Spit marine farming zone is considered an area with potential for the culture of shellfish using intertidal farming methods. The zone will allow some expansion of the marine farming industry using these particular methods of farming.

Zone I 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	607192.94E	5425624.31N	41° 18.8237'S	148° 16.8386'E	thence to
1b	607457.61E	5425221.75N	41° 19.0391'S	148° 17.0326'E	thence to
1c	607192.54E	5425073.07N	41° 19.1215'S	148° 16.8442'E	thence to
1d	606887.40E	5424783.66N	41° 19.2803'S	148° 16.6285'E	thence to
1e	606592.69E	5424975.77N	41° 19.1788'S	148° 16.4153'E	thence to
1a	607192.94E	5425624.31N	41° 18.8237'S	148° 16.8386'E	

GDA 94-ZONE 55

The zone size has been set at approximately 31 ha with a maximum leasable area of 25 ha. The species to be farmed will be limited to shellfish and seaweed. Map 5 shows the zone.

Specific Management Controls

To reduce the visual influences of marine farming operations within Zone I all marine farming operations will be required to conform to the following management control.

- Marine farming equipment within Zone I will be limited to the use of tensioned wire farming methods commonly known as the BST system.

Zone 2 (East McDonalds Point)

Location

The zone is situated at the mouth of Moulting Bay, approximately 600 m east of McDonalds Point where the George River enters Georges Bay. The Humbug Point State Recreation Area is located 320 m north-west of the zone. The area is a deepwater site.

Environmental Conditions

Water depth within the zone ranges from 12 to 22 m. Water temperatures have been recorded in the vicinity of navigation pylon 8A and indicate a range of 8.4°C to 19.4°C with a salinity range of 24.8 ppt to 36.5 ppt. Substrate sampling within the general area indicated a reasonably uniform substrate of fine silt/clay, dark olive-grey in colour, with a "sloppy" fine silt surface layer. A description of sediment samples and footage of two video transects is provided below.

Sediment Samples

Site No. Description of sediment type, colour & texture

6	Fine silt "sloppy" surface layer (dark olive-grey) with slightly firmer and darker coloured silt/clay. Relatively loosely compacted. No smell.
7	As above, though subsurface slightly mottled. Two thin worms.
8	As above. Some <i>Heterozostera</i> debris (blades) in subsurface (black surrounds). Two thin worms. No smell.
9	As above.

Vertical Video Drop and Drift

Description of bottom type

Considerable amount of suspended particulate matter in water column. Visibility very poor. Very sparse patchy "low" weed on bottom, silty substrate easily resuspended.

Considerable amount of suspended particulate matter in water column. Visibility very poor. Unable to see the bottom but knew the camera was there because of plumes of silty substrate resuspended. (camera light on maximum)

As the zone is a new marine farming area, further baseline environmental data will need to be collected before development occurs within the zone.

Existing Farming Activities

There are no existing marine farms within the zone.

History of Marine Farming Activities

There is no history of marine farming within the zone.

Future Potential

The zone has been identified as an area with the potential for the culture of shellfish using subtidal methods, given the water depth, expected current flow and also the production results of other farms in adjacent areas.

Navigation Channels

The zone lies to the west of the main navigation channel leading to St Helens. The south eastern corner of the zone is the closest point to this navigation channel. The zone will not impact on the use of this channel.

Marinas, Public Jetties and Other Public Facilities

There is a private jetty and a number of moorings located off Bayview over 1 km to the north west of the zone.

Surrounding Land Use

McDonalds Point is located to the west of the zone and is coastal reserve. The coastal reserve gives way to private freehold land, zoned Rural A and is the site of an existing aquaculture hatchery and also the depot facilities for two existing marine farms. The Humbug Point State Recreation Area is also located 320 m to the north east of the zone.

Sewage and Stormwater Outlets

The existing hatchery has an approved evaporation pond for the treatment of effluent. Residential dwellings at Bayview, over 1 km to the north west, have approval for septic tanks. The outfall for the St Helens sewage scheme is located approximately 2 km to the south west of the zone. The scheme is located off the Binalong Bay Road and consists of two ponds for primary and secondary treatment. Secondary treated, unchlorinated effluent is discharged approximately 100 m from the coastline, within Georges Bay.

The sewage scheme has undergone an Environmental Improvement Program (EIP) regulated by DELM. The EIP required Council to improve the management of the St Helens sewage lagoon plant and monitor its performance so as to optimise its operation within the constraints of its present design and investigate reuse options. National Heritage Trust funding has subsequently been secured for the Council's proposal to reuse the wastewater onto agricultural land and remove the present discharge from Georges Bay. The sewage outfall continues to be monitored under TSQAP. Monitoring results indicate that sewage discharge is not a problem to the existing marine farming within Georges Bay.

Summary of Zone

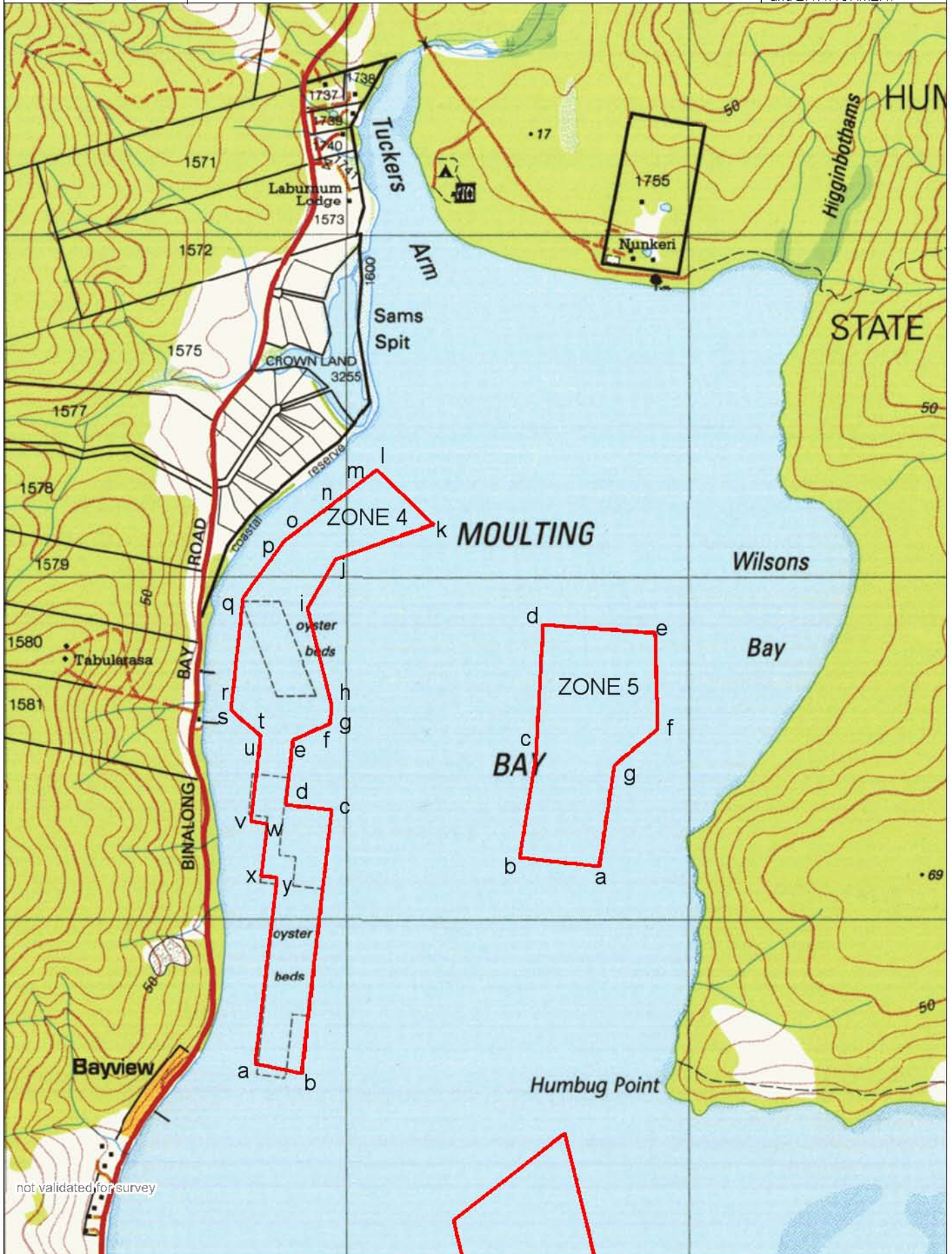
The zone has been created because of the potential that it holds for the culture of shellfish. The boundary of the zone have been designed to allow for the potential of two marine farms with a maximum leasable area of 5 ha each, with a separation distance of 100 m.

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

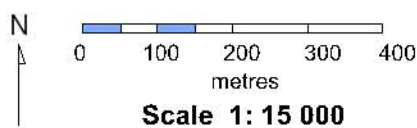
ID	Easting	Northing	Latitude	Longitude	
2a	607420.99E	5426301.53N	41° 18.4559'S	148° 16.9949'E	thence to
2b	607748.16E	5426554.83N	41° 18.3164'S	148° 17.2266'E	thence to
2c	607900.62E	5425922.40N	41° 18.6569'S	148° 17.3426'E	thence to
2d	607572.77E	5425671.47N	41° 18.7951'S	148° 17.1103'E	thence to
2a	607420.99E	5426301.53N	41° 18.4559'S	148° 16.9949'E	

GDA 94-ZONE 55

The zone size is approximately 24.49 ha with a maximum leasable area of 10 ha. The species to be farmed will be limited to shellfish and seaweed. Map 5 shows the zone.



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



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

Zone 4 (Moultling Bay West)

Location

The Moultling Bay West marine farming zone is located on the western side of Moultling Bay, approximately 70 m from the adjacent coastline and 890 m from the mouth of the George River. The zone incorporates two existing intertidal marine farming leases.

The land adjacent to the area is zoned Rural B and is covered in sclerophyll forest. The immediate foreshore consists of a sandy/silt beach giving way to Melaluca scrub. There is a subdivision adjacent to the northern end of the zone which has been developed since the establishment of the existing farms. There is also a subdivision to the south of the zone at Bayview.

Environmental Conditions

Water depth within the zone is up to 2 m with a substrate ranging from a fine silt, which is soft and boggy, to a firmer and coarser silt/sand. In some sections of the zone there is a covering of *Heterozostera tasmanica* with anecdotal evidence suggesting that these areas are on the increase. Water temperatures have been recorded within the zone and range between 8.1°C to 22.1°C with a salinity range of 0.600 ppt to 35.100 ppt.

Existing Farming Activities

There are two existing marine farms within this zone. St Helens Oysters Pty Ltd is the current holder of marine farm lease number 9 located at the southern end of the zone.

<i>Farm No 9</i>	Area	13.67 ha
	Granted	1990
	Duration	20 years
	Species	Pacific oysters, native oysters, mussels

Locklow Nominees Pty Ltd is the current holder of marine farm lease number 65 at the northern end of the zone.

<i>Farm No 65</i>	Area	16.49 ha
	Granted	1984
	Duration	20 years
	Species	Pacific oysters, mussels.

History of Marine Farming Activities

Marine Farm Lease No 9

An application was received by the Lands Department in April 1973 to farm Pacific oysters in Moulting Bay, St Helens. The proposal was advertised in July 1975 with approval given to commence operations in July 1975 in an area 270 m x 400 m.

A lease was issued to take effect from 1 September 1975 for a period of ten years. This was subsequently transferred to a new holder in 1977.

In August 1981 the lease boundaries were modified to move the lease further offshore and to expand the lease in a northerly direction.

In September 1983 an application to vary the lease to include a more protected area of 2 ha for holding juvenile and finished stock was approved.

In September 1990 an application to renew the lease for a term of twenty years, from the first day of November 1990, was approved.

In 1991 the lease was transferred into the name of St Helens Oyster Pty Ltd, the current holder.

Marine Farm Lease No. 65

An application was received by the Lands Department and Tasmanian Fisheries Development Authority (TFDA) in May 1979 for two areas in Moulting Bay, one area on the western shore of the bay to collect oyster spat, and another on the eastern shore for the culture of mussels.

The Lands Department initially had concerns about the area on the eastern side of Moulting Bay due to its proximity to the Humbug Point Recreational Area. This issue was clarified, as the area applied for was situated offshore and would not restrict access to Wilsons Bay and the State Recreation Area.

During 1982 the responsibility for the allocation of marine farming leases was transferred from the Lands Department to the TFDA.

Following discussions between the TFDA and the applicant, a revised application was advertised on 19 December 1983 for an area of 16.5 ha of an irregular shape on the western side of Moulting Bay.

Two objections were received on the grounds of debris from marine farms, oyster overcatch, site rehabilitation and lack of benefits to the local community.

Following consideration of these objections a marine farming lease was issued from 1 May 1984 for a term of 20 years for an area of 16.5 ha.

Concerns about extensions to the farm were expressed by some land holders in an adjacent subdivision. These extensions were within a previously undeveloped area of the existing lease and were not an extension to the actual lease area.

This marine farm was transferred to the current holder in December 1994.

Future Potential

Marine Farm Lease No. 9

The current holder of the existing lease considers the area suitable for the continued cultivation of Pacific oysters. The lease is considered to be fully developed and has been at capacity production for approximately the last two years. The area is used to grow Pacific oysters from juveniles through to product suitable for harvest. The lessor is interested in the potential cultivation of other species such as mussels and scallops in the area. The current lease holder has concerns about any future expansion of shellfish farming in the intertidal area of Moulting Bay in relation to productivity.

Marine Farm Lease No. 65

The current holder has held the lease since December 1994. Since purchase, the lease area has been developed from 7.5 ha to 16.49 ha, and is now considered to be fully developed. The current holder considers the area to be suitable for the continued production of Pacific oysters with the site having adequate water flow, growth rates and being a relatively easy site to work. The current lease holder has concerns about any future expansion of shellfish farming in the intertidal area of Moulting Bay in relation to productivity.

Navigation Channels

The zone does not interfere with any major navigation channel or safe anchorage.

Marinas, Public Jetties and Other Public facilities

There are no public jetties immediately adjacent to the zone. There is a private jetty located approximately 260 m to the south of the zone at Bayview. The zone will not interfere with the use of this facility. There are two private licensed jetties immediately adjacent to the zone, used by the existing lease holders in association with their shore based facilities.

Surrounding Land Use

The land immediately adjacent to the zone consists of crown land. There is a strip of coastal reserve adjacent to the northern region of the zone. The land to the west of Binalong Bay Road is zoned Rural B. There is a subdivision adjacent to the northern sections of the zone which is zoned Rural Residential A. There is also a recreation area and camping area at the head of Moulting Bay located over 700 m to the north of the zone.

Sewage and Stormwater Outlets

There is a subdivision adjacent to the northern section of the zone and another south of the zone at Bayview. Dwellings in these subdivisions have approval for septic tank sewage treatment. The two existing shore base facilities are located on crown land adjacent to the mid region of the zone. One depot has septic tank approval whilst the other disposes of sewage into the St Helens scheme using portable facilities. There is no evidence of stormwater outlets adjacent to the zone.

Summary of Zone

The zone is considered appropriate for the continued operation of the existing marine farms. Due to surrounding land based uses and productivity concerns, it is not considered appropriate to allow any expansion of the existing marine farms.

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	606841.37E	5426758.05N	41° 18.2138'S	148° 16.5747'E	thence to
4b	606977.96E	5426731.08N	41° 18.2273'S	148° 16.6729'E	thence to
4c	607066.30E	5427500.59N	41° 17.8108'S	148° 16.7281'E	thence to
4d	606930.86E	5427514.86N	41° 17.8042'S	148° 16.6309'E	thence to
4e	606952.72E	5427706.23N	41° 17.7007'S	148° 16.6445'E	thence to
4f	607057.97E	5427753.42N	41° 17.6743'S	148° 16.7194'E	thence to
4g	607059.19E	5427753.29N	41° 17.6744'S	148° 16.7203'E	thence to
4h	607064.72E	5427803.25N	41° 17.6473'S	148° 16.7237'E	thence to
4i	606993.46E	5428089.65N	41° 17.4931'S	148° 16.6696'E	thence to

4j	607076.17E	5428233.55N	41° 17.4148'S	148° 16.7274'E	thence to
4k	607362.67E	5428336.27N	41° 17.3569'S	148° 16.9315'E	thence to
4l	607197.77E	5428496.40N	41° 17.2717'S	148° 16.8117'E	thence to
4m	607179.38E	5428481.41N	41° 17.28'S	148° 16.7987'E	thence to
4n	607070.06E	5428396.96N	41° 17.3265'S	148° 16.7213'E	thence to
4o	606943.97E	5428300.63N	41° 17.3795'S	148° 16.6319'E	thence to
4p	606929.37E	5428290.04N	41° 17.3854'S	148° 16.6216'E	thence to
4q	606806.99E	5428120.95N	41° 17.4777'S	148° 16.5357'E	thence to
4r	606769.66E	5427792.00N	41° 17.6557'S	148° 16.5124'E	thence to
4s	606771.61E	5427791.40N	41° 17.6561'S	148° 16.5139'E	thence to
4t	606858.50E	5427717.19N	41° 17.6954'S	148° 16.5769'E	thence to
4u	606858.27E	5427716.45N	41° 17.6959'S	148° 16.5767'E	thence to
4v	606829.37E	5427467.53N	41° 17.8306'S	148° 16.5586'E	thence to
4w	606876.72E	5427460.36N	41° 17.8341'S	148° 16.5926'E	thence to
4x	606859.54E	5427308.22N	41° 17.9164'S	148° 16.582'E	thence to
4y	606905.08E	5427302.98N	41° 17.9189'S	148° 16.6146'E	thence to
4a	606841.37E	5426758.05N	41° 18.2138'S	148° 16.5747'E	

GDA 94-ZONE 55

The zone size is approximately 31.43 ha with a maximum leasable area of 30.16 ha, the area of the two existing marine farming leases. The species to be farmed will be limited to shellfish and seaweed. Map 6 shows the zone.

Zone 5 (Moulting Bay East)

Location

The Moulting Bay East marine farming zone is located on the eastern side of Moulting Bay, approximately 240 m from the coastline of Humbug Point State Recreation Area. The zone incorporates two existing deep water marine farm leases.

The land adjacent to the zone consists of the Humbug Point State Recreation Area and is predominantly covered in open sclerophyll bush. Wilsons Bay is located to the east of the zone with a coastline of coarse sand and mud beaches punctuated by granite rocks.

Environmental Conditions

Water depth within the zone varies between 4 and 10 m with a substrate of sand and silt. Water temperatures recorded within the zone indicated a range of 7°C to 20.4°C, and a salinity range of 5.6 ppt to 35.3 ppt. Prior to any expansion of marine farming operations within the zone, further baseline environmental data will be collected.

Existing Farming Activities

There are two existing marine farm leases within Zone 5. Mack Aquaculture is the holder of the marine farm lease in the northern section of the zone.

<i>Farm No 27</i>	Area	7 ha
	Granted	1983
	Duration	20 years
	Species	Pacific oysters, flat oysters, mussels and clams

J Harris is the holder of marine farm lease 144 located in the southern section of Zone 5.

<i>Farm No 144</i>	Area	3.001 ha
	Granted	1991
	Duration	20 years
	Species	mussels, Pacific oysters

History of Marine Farming Activities

Marine Farm Lease No. 27

This application was received in September 1982 for an area of 7 ha within Moulting Bay for the culture of mussels using longline methods.

Initially the Department of Public Health had concerns regarding the harvesting of shellfish for human consumption from the area. However these concerns were withdrawn following an extensive water quality survey of Georges Bay completed by Public Health.

The application was advertised on 27 August 1983 with no objections being offered.

The application was approved in November 1983 with a lease subsequently being granted for an area of 7 ha measuring 250 x 280 m located 250 m from the closest shoreline.

In 1985 an application to vary the lease to include the farming of Pacific oysters was rejected following concerns expressed by existing lease holders on the grounds of productivity. The lease holder was informed that the Department of Sea Fisheries was to undertake a productivity assessment for the area. In 1988 an application was approved to include Pacific oysters among the species licensed for farming.

Periodically the lease has been used in conjunction with exploratory licences to hold wild harvested native oysters prior to marketing. The holder of the lease also wild harvests clams which are held on the lease for seven to 14 days prior to marketing.

Marine Farm Lease No. 144

An application was received in March 1990 for an area of 3 ha in Moulting Bay for the purpose of mussel culture. The application site was moved north west following consideration of foreshore access concerns.

The Department of Parks, Wildlife and Heritage advised that whilst they did not have concerns with the application site it should be made clear to the applicant that no use of the adjacent State Recreational Area would be permitted.

The application was advertised on 20 July 1991 and received nine objections, mainly with regard to impacts on recreational activities in the area. After consideration of these objections, the application was approved on 3 October 1991. One appeal was lodged with the Court of Petty Sessions, but this appeal was not progressed. A Permit document was issued for 20 years effective from 1 December 1991.

Future Potential

Marine Farm Lease No. 27

The lease is approximately sixty percent developed and the holder considers the site to be suitable for the culture of mussels and oysters. Currently mussels are the major species under cultivation, however the holder intends to develop the area to two-thirds mussel production and one-third for oyster conditioning or fattening.

Marine Farm Lease No. 144

Marine farm lease number 144 is currently fully developed, two thirds with mussels and one third with Pacific oysters. The current lease holder considers the site excellent and is experiencing what he considers to be good growth rates.

A study on the water movements of Moulting Bay area showed that the south eastern section of Moulting Bay around Humbug Point has distinct water flow patterns. The water in this area eddies and exchanges more frequently with the rest of Georges Bay than the other areas of Moulting Bay.

Navigation Channels

The zone does not restrict any major navigation channel or safe anchorage.

Marinas, Public Jetties and Other Public Facilities

There are no public jetties or other public facilities immediately adjacent to the zone. There are two private jetties located 900 m from the zone on the western shores of Moulting Bay. These facilities are associated with the two marine farm leases located within Zone 4. The zone will not impact on the use of these facilities.

Surrounding Land Use

The land immediately adjacent to the zone consists of the Humbug Point State Recreation Area. There is a walking track that runs from the head of Moulting Bay around Humbug Point to Dora Point camping ground. There is a recreation area and camping area at the head of Moulting Bay located over 1 km to the north of the zone.

Sewage and Stormwater Outlets

There are no sewage or stormwater outlets adjacent to the zone. There is a subdivision 900 m to the west of the zone. Dwellings in this subdivision have approval for septic tank sewage treatment.

There are two existing shore base facilities on the western shore of Moulting Bay; one has septic tank approval while the other disposes of sewage into the St Helens scheme, using portable facilities. There is one dwelling located at the head of Moulting Bay, which has septic tank approval.

Summary of Zone

The zone is considered suitable for the continued operation of the two existing marine farm leases and allows for a potential expansion of 6 ha.

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

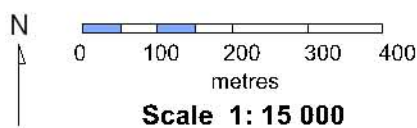
ID	Easting	Northing	Latitude	Longitude	
5a	607847.43E	5427334.68N	41° 17.8943'S	148° 17.2895'E	thence to
5b	607615.17E	5427361.13N	41° 17.8818'S	148° 17.1228'E	thence to
5c	607663.38E	5427662.02N	41° 17.7188'S	148° 17.1541'E	thence to
5d	607682.37E	5428042.03N	41° 17.5134'S	148° 17.1637'E	thence to
5e	608011.79E	5428018.45N	41° 17.5235'S	148° 17.3999'E	thence to
5f	608020.37E	5427737.01N	41° 17.6755'S	148° 17.4091'E	thence to
5g	607893.25E	5427631.93N	41° 17.7333'S	148° 17.3191'E	thence to
5a	607847.43E	5427334.68N	41° 17.8943'S	148° 17.2895'E	

GDA 94-ZONE 55

The zone area has been set at approximately 19.76 ha with a maximum leasable area of 16 ha, an increase of 6 ha on the existing operations. The species farmed within the zone will be limited to shellfish and seaweed. Map 6 shows the zone.



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



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

Zone 6A & 6B (South West Pelican Point)

Location

The zone incorporates two tidal sandbars surrounded by deeper channels and is located to the west of navigation pylons 1 and 3 and to the north east of pylon 5.

The land adjacent to the west of the zone is the Humbug Point State Recreation Area with a coastline of sand beaches and isolated granite outcrops, giving way to hilly undulating country covered in open sclerophyll bush. The land to the east is the St Helens Point State Recreation Area, consisting of mudflats and saltmarsh. Residential and holiday house development occurs at Lords Point and Akaroa.

The zone has been divided into two sub-zones, A and B. Sub-zone A consists of 12.40 ha and is located approximately 280 m from the coastline of the Humbug Point State Recreation Area at its closest point. Sub-zone B is located to the east of sub-zone A, 390 m from the coastline of the Humbug Point State Recreation Area and 460 m to the west of Pelican Point. The zone is 8.299 ha in area.

Environmental Conditions

The zone is generally shallow with a water depth up to 3 m depending on tide height. Sections of the zone will be exposed at low tides. Vegetated regions within the zone consist mainly of seagrass (*Heterozostera tasmanica*) mixed with predominantly sea lettuce (*Ulva sp.*). Water temperature has been recorded at Lords Point and Pelican Point, indicating a range of 8.1 C to 18.1 C with a salinity range of 25.0 ppt to 36.0 ppt indicated.

A description of the grab samples and video footage taken in the northern, mid and southern sections of the zone is given below for both sub-zones.

Sub-zone A

Sediment Samples

Site No.	Description of sediment type, colour & texture
16	Fine sand with fine shell grit. Greenish-grey surface with dark greenish-grey subsurface. Relatively loosely compacted. Three small annelids observed in sample.
17	Sample from vegetated region. <i>Heterozostera tasmanica</i> , some sea lettuce (<i>Ulva sp.</i>), filamentous green algae (preliminary identification <i>Chaetomorpha sp.</i>).

- 18 Sample taken from sand patch within vegetated region. Relatively fine sand similar to that described for site 1 above. Slight smell of hydrogen sulphide in subsurface. Not firmly compacted.
N.B: Vegetated surrounds predominantly sea grass *Heterozostera tasmanica*, *Ulva sp.*, and fine filamentous green algae (preliminary identification *Enteromorpha sp.*).
- 19 Greenish-grey sand surface with dark greenish-grey subsurface of fine sand with shell grit. Fragments of *Heterozostera tasmanica* and fine filamentous algae.
- 20 Thin greenish-grey coloured sand surface with dark greenish-grey subsurface of sand. Strong hydrogen sulphide (H₂S) smell. Clam/cockle valves on surface.
- 21 Thin surface layer of greenish-grey sand with grey/black subsurface of sand and shell grit. Strong hydrogen sulphide odour. Clam/cockle valves scattered on surface.
-

Vertical Video Drop and Drift

Description of bottom type

Sand bottom with approximately 30-50% vegetation cover, predominantly sea grass (*Heterozostera tasmanica*) and sea lettuce (*Ulva sp.*).

70-90% vegetation cover, predominantly sea grass (*Heterozostera tasmanica*) and sea lettuce (*Ulva sp.*). Occasional drift weed (e.g. *Ecklonia radiata*).

Sand with shell grit, uneven surface with burrow holes and low mounds. Sand grey/black appearance in some patches. Occasional *Ulva sp* and *Heterozostera*. Relatively bare surface, though some regions have the appearance of an algal "mat" covering (benthic phytoplankton). Drift into reasonably dense *Heterozostera tasmanica* with much epiphytic growth on blades.

Sand, uneven surface with occasional larger depressions. Grey appearance with some regions showing patches of an algal mat covering (benthic phytoplankton). Occasional *Ulva sp* and *Heterozostera*. Burrow holes with dark coloured sand surrounds. Scattered clam/cockle valves on surface. Bubbles released from sediment, possibly from crab burrows.

N.B: Sediment sample collected from this site showed a very shallow surface layer with grey/black subsurface of sand/shell grit having a strong H₂S odour.

A concern with this zone was the presence of a definite hydrogen sulphide odour noted with some of the sediment samples collected. This indicates anoxic conditions within the substrate, and sampling showed the anoxic layer to be quite shallow (or close to the surface) in some locations. It is suggested that care be taken with use of this area for shellfish aquaculture for two main reasons: (1) concern with the capability of the substrate to cope with additional loading of organic matter sourced from shellfish, and (2) disturbance of the sediment releasing hydrogen sulphide could be detrimental to shellfish. It is suggested if farming of shellfish occurs within this zone, then reduced stocking densities should be used.

Sub-zone B

Sediment Samples

Site No.	Description of sediment type, colour & texture
22	Fine sand with fine shell grit, greenish-grey. Relatively loosely compacted. No smell. N.B: Patches of sea grass (<i>Heterozostera tasmanica</i>) mixed with sea lettuce (<i>Ulva sp</i>) and filamentous weed visible in near surrounds.
23	Fine sand with fine shell grit, greenish-grey surface with subsurface slightly darker colour. Small, fine faecal pellets/worm casts evident on surface. Two flat worms, approximately 3 cm long observed in sediment. No smell.
24	Grab sample taken from patch of weed. Sea lettuce (<i>Ulva sp</i>), filamentous red algae, small weed fish, two small shrimps. Black sand with shell grit, with a very gelatinous surface. Strong hydrogen sulphide odour. Decomposing sea weed present. Very loose soft substrate.
25	Grab sample taken from clear patch of sand between weed. Fine sand with fine shell grit, greenish-grey surface with subsurface slightly darker colour. Small, fine faecal pellets/worm casts debris evident on surface.
26	Fine sand with fine shell grit, greenish-grey surface with subsurface slightly darker colour. Small, fine faecal pellets/worm casts debris evident on surface.
27	Sample collected from near above site, but from weed patch. Fine sand with fine shell grit, greenish-grey surface with slightly darker subsurface. Predominantly sea lettuce, some sea grass and fine filamentous green algae (preliminary identification <i>Cladophora sp</i>). One holothurian on sea lettuce blade, 1 live European shore crab (<i>Carcinus maenus</i>).

Vertical Video Drop and Drift

Description of bottom type

Undulating sand bottom, grey in appearance. Burrow holes and mounds visible, brown filamentous weed, occasional clump of ascidians with sea lettuce (*Ulva sp*) attached.

Low undulating sand bottom, grey in appearance. Burrow holes and mounds. Some *Ulva sp.* with fine brown filamentous weed attached. Occasional clump of ascidians with *Ulva* attached.

Vegetated region, approximately 90% cover. *Ulva sp*, *Heterozostera tasmanica* with reasonable amount of over-growth of fine brown filamentous weed. Drift into sand with burrow holes and mounds.

Patchy weed over sand, predominantly *Heterozostera tasmanica* and *Ulva sp.* Epiphytic growth on *Heterozostera* blades. Fine filamentous green weed (preliminary identification *Enteromorpha sp.*).

Low undulating sand bottom, grey in appearance, burrow holes. Sparse *Heterozostera tasmanica*.

As the zone is a new marine farming area, further baseline environmental data will need to be collected before development occurs within the zone.

Existing Farming Activities

There are no existing marine farms within the area.

History of Marine Farming Activities

There is no history of marine farming within the zone.

Future Potential

Both the zones have been identified because of the potential they hold for the culture of shellfish using intertidal methods.

Navigation Channels

The zones are located to the west of the major navigation channel leading to St Helens. There are also a number of channels surrounding and dividing the two sub-zones. These channels are navigable to smaller recreational craft depending on tide levels. The zone will not impact on the use of these navigation channels.

Marinas, Public Jetties and Other Public Facilities

There is a private jetty located at Akaroa, approximately 600 m to the south east of the zone. The zone will not impact on the use of this facility.

Surrounding Land Use

The Humbug Point State Recreation Area is located to the west of the zone. There is a walking track running from Clerk Point around the coastline of the Recreation Area to Wilsons Bay. The area to the east of the zones consists of the St Helens Point State Recreation Area.

There are a number of residential and holiday dwellings located at Lords Point, 450 m to the south of the zone, and Akaroa, 600 m to the south of the zone. These areas are zoned Low Density Residential.

Sewage and Stormwater Outlets

Residential developments to the south of the zone at Lords Point and Akaroa are connected to the Stieglitz sewage scheme. This scheme does not discharge effluent in Georges Bay and is a full re-use scheme which, when complete, will involve the application of secondary treated effluent to the Stieglitz aerodrome. There is no evidence of stormwater outfalls adjacent to the zone.

Summary of Zone

The zone is identified as a suitable area for the cultivation of shellfish using intertidal farming methods.

Sub-zone 6A 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	
6Aa	610181.37E	5427537.02N	41° 17.766'S	148° 18.9595'E	thence to
6Ab	610050.37E	5427854.01N	41° 17.5958'S	148° 18.8622'E	thence to
6Ac	610074.37E	5428319.02N	41° 17.3444'S	148° 18.8743'E	thence to
6Ad	610183.16E	5428411.86N	41° 17.2933'S	148° 18.9512'E	thence to
6Ae	610237.13E	5427866.81N	41° 17.5874'S	148° 18.9958'E	thence to
6Af	610300.71E	5427586.72N	41° 17.7382'S	148° 19.0444'E	thence to
6Aa	610181.37E	5427537.02N	41° 17.766'S	148° 18.9595'E	

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Sub-zone 6B 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	
6Ba	610278.56E	5428360.59N	41° 17.3202'S	148° 19.0202'E	thence to
6Bb	610364.32E	5427611.96N	41° 17.724'S	148° 19.0897'E	thence to
6Bc	610402.46E	5427626.99N	41° 17.7156'S	148° 19.1169'E	thence to
6Bd	610479.45E	5428271.05N	41° 17.3669'S	148° 19.165'E	thence to
6Ba	610278.56E	5428360.59N	41° 17.3202'S	148° 19.0202'E	

GDA 94-ZONE 55

Sub-zone 6A size has been set at approximately 12.40 ha with a maximum leasable area of 12.40 ha. Sub-zone 6B size has been set at approximately 8.299 ha with a maximum leasable area of 8.299 ha. The species to be farmed will be limited to shellfish and seaweed. Map 7 shows the zone.

Specific Management Controls

To reduce the visual influences of marine farming operations within Zone 6 all marine farming operations will be required to conform to the following management control.

- Marine farming equipment within Zone 6 will be limited to the use of tensioned wire farming methods commonly known as the BST system.

Management Controls

Appropriate measures are also required to satisfactorily manage any negative effects which the draft Plan might have. These measures are included in the requirements set out below.

1. General Controls for all Marine Farming Zones

There must be no unacceptable environmental impact outside the boundary of the marine farming lease area. Relevant 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 intertidal farming of oysters there must not be more than the equivalent of either 1 km of stocked racking or 3 km of stocked post and wire farming equipment (commonly known as the BST system) per hectare of lease area¹.
- (ii) When racking and post and wire farming equipment is next replaced in all existing lease areas used for the intertidal farming of oysters there must not be more than the equivalent of either 1 km of stocked racking or 3 km of stocked post and wire farming equipment (commonly known as the BST system) per hectare of lease area¹.
- (iii) Containers of oysters in intertidal lease areas must be clear of the seabed and there shall be no layering of containers on the racking.
- (iv) In all new lease areas used for deepwater farming of shellfish there must not be more than 1.1 km of effective backbone longline per hectare of lease area.
- (v) When longlines are next replaced in all existing lease areas used for deepwater farming of shellfish there must not be more than 1.1 km of effective backbone longline per hectare of lease area.

¹ For the purposes of 2 (i) and 2 (ii) above each 100 m of stocked racking shall be deemed equivalent to 300 m of stocked post and wire farming equipment in circumstances where both systems are used in a lease area at the same time.

- (vi) All longlines and associated equipment for filter feeding shellfish must be maintained clear of the seabed.

3. Environmental Controls Relating to Monitoring

- (i) All marine lease areas for shellfish must comply with the Environmental Monitoring Program for shellfish as specified in the relevant marine farming licence.
- (ii) Lessees will provide to the Marine Resources Division (DPIWE) estimated numbers or biomass of each species of shellfish in a lease area for which a marine farming licence is held as requested or otherwise on an annual basis.
- (iii) Environmental data are to be collected and analysed to specified standards at each shellfish lease area by persons approved and authorised by the Marine Resources Division (DPIWE). The monitoring requirements for collection, reporting and analysis are specified in the relevant marine farming licence.
- (iv) For all new lease areas being established, and for all expansions greater than 10% to existing marine farming leases, a baseline survey is required before marine farming operations commence. Assessment of this information will be used to determine future management and monitoring requirements of the area.
- (v) For all new lease areas being established, and for all expansions greater than 10% to existing marine farming leases, the composition of benthic communities will be assessed to determine whether the area to be farmed contains any rare and endangered species or any unusual habitat. Assessment of this information will be used to determine future management and monitoring requirements of the area.
- (vi) All bivalve shellfish lease areas must comply with the requirements of the Tasmanian Shellfish Quality Assurance Program and with any directions from the Minister for Health and Human Services.
- (vii) In areas where the growth rates of shellfish have declined and questions arise over the carrying capacity of a growing area, lessees, when required by Marine Resources Division (DPIWE) to do so, must regularly measure the growth of samples of shellfish and provide results to the Marine Resources Division (DPIWE).

4. Chemical Controls

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

5. Controls on Waste

Wastes from harvesting or processing of produce from marine lease areas and from the removal of fouling organisms from marine farming structures and equipment, such as nets, must be disposed of in a manner that does not affect the ecology of the marine environment or nearby shorelines.

6. Disease Controls

- (i) Any suspected disease must be notified to the Department of Primary Industries, Water and Environment in accordance with the *Animal Health Act 1995*.
- (ii) The lessee shall comply with the appropriate industry health surveillance programs and health control measures.
- (iii) Farmed shellfish must not be intentionally released into State waters unless authorised in the relevant marine farming licence.

7. Visual Controls

Lessees must ensure that all marine farming structures and equipment on marine farming lease areas conform to the following conditions in order to reduce visual impact as far as practicable:

- (i) All buoys used for marine farming operations other than those specified for navigational requirements will consist of the inverted cone shaped buoys, as approved in marine farming licence conditions. Existing lease areas will have five years to conform. All new lease areas must conform immediately on commencement.
- (ii) All buoys, netting and other floating marine farming structures and equipment on the sea must be grey to black in colour, or be any other colour that is specified in the marine farming licence. Existing marine lease areas have five years to conform. All new lease areas must conform immediately on commencement.

- (iii) Wherever possible, marine farming structures and equipment must be low in profile and be of a uniform size and shape. Existing marine lease areas have five years to conform. All new marine lease areas must conform immediately on commencement.
- (iv) Posts on each section of racking on intertidal lease areas must be trimmed to be of consistent height.
- (v) Row markers on intertidal lease areas are to be trimmed to be of consistent height.
- (vi) Redundant or dilapidated marine farming structures and equipment must be removed from the lease area at the request of the Secretary (DPIWE). The lease area must be kept neat and tidy in a manner required by the Secretary (DPIWE).
- (vii) Floating storage huts, grading facilities and shelters must not be located within a lease area unless authorised under the relevant marine farming licence.
- (viii) Care is to be taken with the aiming and brightness of security and spot lights so as not to cause unnecessarily adverse effects on the amenity of residential properties.
- (ix) Where possible lights are to be shielded from all but essential directions. Spot lights must be positioned as high above the water as practicable to maximise penetration and minimise reflection.
- (x) The general flood lighting of areas is discouraged except in emergency situations. Bright lights must not be shone seaward so that they interfere with navigation.
- (xi) Anchors and mooring lines that extend outside the lease area must be at least 5 m below the surface at the boundary of the lease area.

8. Access Controls

- (i) Lessees must mark the external boundaries of the lease area in whatever manner is required by the Secretary (DPIWE) 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 (DPIWE).

9. Other Controls

- (i) Lessees must comply with any other Act or regulations that may affect the lease area or the marine farming operations in that lease area.
- (ii) Lessees must ensure that marine farming operations meet the Primary Industry, Water and Environment guidelines on noise levels, as required under the *Environmental Management and Pollution Control Act 1994*.
- (iii) 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 return the marine farming structures and equipment to the lease area, to secure the marine farming structures and equipment and to tidy up any area affected by the debris.
- (iv) 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.
- (v) Lessees must permit the Minister, or persons authorised by the Minister, to enter into and inspect the lease area at all reasonable times.
- (vi) Lessees must comply with all lawful written requirements of the Minister.

10. Specific Management Control for Zone 1

To reduce the visual influences of marine farming operations within Zone 1 all marine farming operations will be required to conform to the following management control.

- (i) Marine farming equipment within Zone 1 will be limited to the use of tensioned wire farming methods commonly known as the BST system.

11. Specific Management Control for Zone 6

To reduce the visual influences of marine farming operations within Zone 6 all marine farming operations will be required to conform to the following management control.

- (i) Marine farming equipment within Zone 6 will be limited to the use of tensioned wire farming methods commonly known as the BST system.

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Glossary

anoxic	Limited supply of oxygen in the sediments
DHHS	Department of Health and Human Services
DELM	Department of Environment and Land Management
DPIF	Department of Primary Industry and Fisheries
DPIWE	Department of Primary Industries, Water and Environment (NB. DPIF and DELM amalgamated in September 1998 to form DPIWE)
GPS	Global Positioning Systems
MAST	Marine and Safety Tasmania
MHB	Marine Board of Hobart
MRLs	Maximum Residual Levels
oxic	Plentiful supply of oxygen in the sediments
Photic depth	Depth of water to which light penetrates
ppt	Parts per thousand
SALTAS	Salmon Enterprises of Tasmania Pty Ltd
TBT	Tributyl Tin
TFDA	Tasmanian Fisheries Development Authority
TSQAP	Tasmanian Shellfish Quality Assurance Program

Species Glossary

Abalone, Blacklip	<i>Haliotis rubra</i>
Abalone, Greenlip	<i>Haliotis laevigata</i>
Atlantic Salmon	<i>Salmo salar</i>
Blue-fin Tuna	<i>Thynnus maccoyii</i>
Clams	<i>Katylesia spp.</i>
Mussels	<i>Mytilus edulis planulatus</i>
Oysters, Flat	<i>Ostrea angasi</i>
Oysters, Pacific	<i>Crassostrea gigas</i>
Periwinkle	<i>Turbo Undulatus</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>
Scallops, Commercial	<i>Pecten fumatus</i>
Scallops, Doughboy	<i>Chlamys asperrimus</i>
Scallops, Queen	<i>Equichlamys bifrons</i>
Stripey Trumpeter	<i>Latris lineata</i>