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 the 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 have led to the establishment of a zoning system, similar to land based schemes to plan and develop marine farming in the State.

The Great Oyster 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 Great Oyster 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 Draft Plan identifies eighteen 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 proposes one zone for the culture of finfish. Five zones cover special lease areas.

Fifteen 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 significantly.

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 Coastal Policy 1996.

**Environmental Impact Statement**

The Environmental Impact Statement gives a background of the area covered by the marine farming development plan, including an outline of existing marine uses and industry operations. The potential impacts of marine farming on other coastal users and values in the coastal zone have been considered in the placement of the zones. In addition, impacts on land under the control of local councils and marine boards have also been considered so as to ensure a co-ordinated approach to developments within the coastal zone. The ecological and other impacts of marine farming are outlined in this section. In an attempt 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 that are specific to that zone, and these are included in the zone descriptions in the development proposals.

1. **General Introduction**
   
The area covered by this marine farming development plan is on the east coast of Tasmania. It is bounded to the south by a line drawn between Cape Bernier and Cape Peron on Maria Island. The eastern boundary extends between Mistaken Cape on Maria Island and Cape Sonnerat on Schouten Island through to Cape Degerando, on Freycinet Peninsula. The northern and western boundaries are the land to the north of Great Oyster Bay and the east coast. The plan area is shown in Map 1.

2. **Characteristics of Great Oyster Bay and Mercury Passage**
   
2.1 **Geographic Description**
   
The Great Oyster Bay and Mercury Passage area is a relatively shallow bay forming part of the continental shelf and occupies approximately one-third of Tasmania's east coast. It is bounded on the north and west by the main Tasmanian coastline, and in the east by Freycinet Peninsula, Schouten Island, and Maria Island. The plan area is approximately 15 km wide (east-west) by 72 km long. The water is less than 40 m deep.

   The waters around Maria Island in the southern section of the plan area have formed part of a long term study on water masses of the east coast of Tasmania (Harris et al. 1987, Harris et al. 1991, Harris et al. 1992). Other studies have been undertaken as part of the Scallop Enhancement and Research Program (Craig P D & McLoughlin R J, 1994). These studies indicate that the currents in Great Oyster Bay are generally low, between 0 and 5 cm-2 which gives a movement of water between 0 and 5 km
in one day. The model prepared for the bay indicated a wind-driven, depth-averaged circulation pattern which predicted the low-frequency motion in Great Oyster Bay with reasonable accuracy. The predominant circulation pattern indicated water moving up the mainland coast and around the north of the bay and following the Freycinet Peninsula south. However, there are many small scale features of the circulation pattern that are determined by the topography of the bay, particularly in the north-eastern and Mercury Passage areas (Craig P D & McLoughlin R J, 1994).

The productivity of the waters in the study area is variable and appears to be related to westerly wind stress and to the La Nina weather patterns. (See Note 1)

There are extensive areas of seagrass and kelp beds along many of the rocky shorelines, and there is evidence to suggest that these habitats have been significantly impacted by human activity (Graham, 1995), including extensive harvesting of kelp in the 1960s and 1970s.

2.2 Land Description

Information on the characteristics of the east coast have largely been drawn from a summary report to the Dorset, Break O’Day and Glamorgan/Spring Bay Councils, prepared in 1995.

The plan area has a variety of coastal land forms ranging from granite mountains to saltmarshes and sandy beaches. Granite mountains and rocky shorelines dominate the Freycinet Peninsula National Park, with small beaches and embayments between the headlands. The most notable of these beaches is Wineglass Bay on the eastern shoreline of the peninsula. Coles Bay, a popular tourist destination, is on the western side of the peninsula. The parent rock type for the coast from Swansea to Triabunna is Triassic basalt, with headlands interspersed with narrow beaches (Davies, JB, 1988).

---

1 Studies on the seasonal and inter-annual variability of phytoplankton and biomass on the east coast of Tasmania indicate that Maria Island lies at a major oceanographic boundary between subantarctic and subtropical waters. Surface waters (0-200 m) off Maria Island were a complex mixture of subantarctic and subtropical waters. Surface temperatures vary between 11-18°C with the inshore fluctuations preceding the offshore variations by approximately one month. Primary productivity (the production of phytoplankton, the base of the marine food chain) was measured over the spring of 1984. Data was given as mg C m⁻³ hr⁻¹ as potential productivity at 100 µmol m⁻² s⁻¹ at surface temperatures. The integral productivities were found to be highest at the time of the spring bloom and converted to annual productivity of approximately 30 mg C m⁻² year⁻¹. The timing of the spring bloom varied from year to year with a variation of about four months, with spring/summer blooms between October and December. An autumnal bloom in April can follow low chlorophyll levels in February and March, which coincide with the influence of subtropical waters (Harris et al. 1987). The productivity of the area, in terms of nitrate and dissolved nitrogen concentrations, is also influenced by the interannual variability in the westerly wind stress. Episodes of new production followed periods of increased westerly wind stress. This indicates a strong interaction between the time scales of wind events, nutrient uptake, phytoplankton growth, grazing, sedimentation, decomposition and resuspension. More oligotrophic (clear) conditions followed warm calm periods in 1987, with higher productivity in windy years. The variability in the productivity of these waters associated with the variability in wind stress appears to be related to the La Nina weather patterns (Harris et al. 1992).
An extensive wetland system exists at Moulting Lagoon in the north of the plan area, and the rivers of the region are generally short with wide fluctuations in flow. There are many coastal lagoons which are periodically opened to the sea. However, most have not been open for several years, possibly as a result of weather conditions. Similarly at the mouths of many of the rivers and estuaries there are extensive bar and ridge systems which periodically reduce the flow of the rivers, and moving barways are a potential hazard to boating in the area. Despite the low rainfall in the area (generally 500-750 mm) large areas of coastal land and hinterland have been cleared for agricultural purposes, and much of the original open eucalypt woodland of the hinterland has been replaced by improved pasture. Nevertheless there are still large areas of native vegetation.

The immediate coastline, in areas dominated by dunes and beach ridge systems, has been heavily modified by grazing and firing. This has resulted in extensive wind erosion and mobilised dunes. Marram grass has been used to stabilise these areas with varying success.

Behind the dune system dry sclerophyll forests form some of Australia's most extensive tracts of this forest type. Interspersed within this forest are isolated areas of native grasslands which support native mammal populations. These include the eastern grey kangaroo, Tasmanian potoroo, rufous wallaby, ringtail possum, brush tail possum, Tasmanian bettong, eastern and spotted quolls, Tasmanian devil, echidna, platypus, various bats, and native rodents, and a wide range of invertebrate fauna.

Several locations on the east coast are important to bird populations, providing a series of protected nesting and roosting sites. At least thirty species of seabird frequent both inshore and offshore waters, including little penguins, Australasian gannet, three albatross species, silver and Pacific gulls, terns, oyster catchers, plovers, dotterels and pelicans. These locations are best illustrated with reference to Maps 2 and 3.

Two larger wetlands of note are the Earlham Lagoon and the Moulting Lagoon Game Reserve, the latter identified as a "Ramsar" site. Australian wetland areas of international importance were listed when Australia signed “The Convention on Wetlands of International Importance, Especially as Waterfowl Habitat”, or “Ramsar”, in 1971. Under the agreement Australia has international obligations to maintain the area for the conservation of wetlands.
There are two National Parks adjacent to Great Oyster Bay, the Freycinet National Park and the Maria Island National Park. There is a marine component of the Maria Island National Park, on the west coast of the northern section of Maria Island. This prohibits commercial and recreational fishing and provides a sanctuary for a range of aquatic species.

The area has many scenic viewlines with panoramas readily available from many points on the coastal road. To maintain the most important vistas areas immediately adjacent to some parts of the coast have been retained free of marine farming. These areas extend for 5 km seaward from Mayfield Beach to Cressy Beach Coastal Reserve and for approximately 4 km from the coastline seaward of Freycinet National Park.

The plan area has been exploited since early European occupation and settlement, but still possesses a rich marine fauna which supports both commercial and recreational fisheries. A number of introduced marine pest species are found within the area, including the Japanese seastar, the Japanese seaweed *Undaria sp*, and the New Zealand screw shell *Maoricolpus roseus*.

2.3 Climate
The climate of the area is described as mild compared with the rest of Tasmania. Rainfall within the area rarely exceeds 800 mm per annum and can be as low as 500 mm in some localities. Temperatures are mild to cool with an average winter maximum of 13°C and an average summer maximum of 23°C. Sea temperatures vary between 12-19°C, whilst inshore waters experience a far greater range of temperatures.
MAP 3 - LOCATION OF MARINE RESERVES AND WATER FOWL NESTING AREAS WITHIN PLAN AREA
2.4 Human Settlements

The coastline was used extensively by Aboriginal Tasmanians prior to European occupation, with evidence easy to find in many coastal landforms. Many of these sites are marked by extensive middens, tools and other artefacts since the east coast was particularly important for the Aboriginal populations, who moved to the area to take advantage of its mild climate during winter.

The east coast of Tasmania was developed for agricultural purposes following European settlement, with fishery and forestry also important in its development. The clearing of land for agricultural production followed the removal of merchantable timber, and the ports and fishing ports were built during the early stages of development. Convict settlements were established along the coast at Orford, Little Swanport, Swansea, and on Maria Island. Before the road network was established, these settlements were serviced by boat but the roads allowed larger centres such as Orford, Triabunna and Swansea to be the focus for consolidation and further development whilst smaller centres such as Little Swanport disappeared. With its mild climate and improved communications with larger centres, in this century the area has become a popular holiday centre and destination for people from other parts of Tasmania. With their strong attraction for recreational boating and fishing, Coles Bay and Orford emerged as the most important and popular destinations within the plan area. However Triabunna, with its deep water port, is the principal town in the Glamorgan Spring Bay Local Government Area, and its recorded population at the 1991 census was 831.

2.5 Social and Economic Description

As in many other parts of rural Tasmania there has been a decline in the traditional activities of fishing, forestry and agriculture, with a significant decline in the number of farms and the area being farmed. For example, during the twelve year period 1981-93 the number of farms decreased by 181 and some 44 000 ha of arable land were lost. Concurrently the number of persons employed in the primary sector has also declined.

There are now fewer, small, privately owned sawmills in the region and there has been a major shift in emphasis towards the export of woodchips. This industry is the main support for the port of Triabunna.

The traditional primary industry activities such as grazing and wool production have declined but have, in part, been replaced by alternative initiatives such as aquaculture and viticulture.
The waters of Great Oyster Bay and Mercury Passage continue to support significant commercial and recreational fisheries although some fisheries have declined significantly in recent decades. Declines in the lobster and scallop fisheries have been particularly pronounced while other fisheries such as abalone continue to perform well, and more recent developments such as live fish fishing and squid have become important to the area.

The inability of primary industries to expand has resulted in the area relying heavily on the tourism industry. Many towns experience very large increases in population during traditional holiday periods. Early tourist hotels and motels were based at Swansea and Orford, whilst the construction of holiday homes also became an important component of new development in all centres except Triabunna. The type of tourism targeted has changed over the past twenty years, with smaller family type holiday locations changing to attract higher spending international tourists. Examples include the Freycinet Lodge and the Freycinet Experience in the Freycinet National Park, and the Eastcoaster Resort south of Triabunna. The warmer climate and proximity to areas of high natural values play a significant role in promoting and attracting tourism on the east coast.

As returns from rural activities declined during the 1970s, the subdivision of rural land resulted in an increased demand for recreation and holiday living, with particular emphasis on waterfront developments. These holiday homes are in most cases owned by people living outside the area and are generally in the higher price bracket. However, a large number of these dwellings/holiday homes are now being occupied on a permanent basis, largely by retirees, except in Triabunna where a large percentage of the population is aged over 55 (Graham, 1994). These rural subdivisions have resulted in ribbon development and now present a range of management problems for local authorities, including expensive areas to service at a time of reduced levels of support for such infrastructure.

The decline in the traditional industries of the region, forestry and agriculture has led to a corresponding decline in the job opportunities for younger people. This has resulted in a high level of unemployment, particularly among the young (15-24 year age group), and a greater dependence on casual and part time employment. The search for increased employment opportunities, skills and experience outside the district results in an out-migration of the region’s young population, which is potentially one of its greatest resources. New employment opportunities within the aquaculture industry can be an important economic consideration in the development and future expansion of the industry within Great Oyster Bay.

The population trends for the main townships in the Glamorgan Spring Bay Local Government Area since 1976 are shown in the Tables below.
Table 1: Population Trends in Orford

<table>
<thead>
<tr>
<th>Year (Census Year)</th>
<th>Population (Number)</th>
<th>Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>351</td>
<td>-</td>
</tr>
<tr>
<td>1981</td>
<td>378</td>
<td>7.7</td>
</tr>
<tr>
<td>1986</td>
<td>458</td>
<td>21.2</td>
</tr>
<tr>
<td>1991</td>
<td>502</td>
<td>9.6</td>
</tr>
</tbody>
</table>

Source: ABS Urban Centres & Localities: Tasmania 1991

Table 2: Population Trends in Swansea

<table>
<thead>
<tr>
<th>Year (Census Year)</th>
<th>Population (Number)</th>
<th>Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>376</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>428</td>
<td>13.8</td>
</tr>
<tr>
<td>1986</td>
<td>411</td>
<td>-3.9</td>
</tr>
<tr>
<td>1991</td>
<td>418</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Source: ABS Urban Centres & Localities: Tasmania 1991

Table 3: Population Trends in Triabunna

<table>
<thead>
<tr>
<th>Year (Census Year)</th>
<th>Population (Number)</th>
<th>Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>881</td>
<td>-</td>
</tr>
<tr>
<td>1981</td>
<td>924</td>
<td>13.8</td>
</tr>
<tr>
<td>1986</td>
<td>883</td>
<td>-3.9</td>
</tr>
<tr>
<td>1991</td>
<td>831</td>
<td>-5.9</td>
</tr>
</tbody>
</table>

Source: ABS Urban Centres & Localities: Tasmania 1991

Whilst Orford and Swansea have experienced some population growth, the decline in Triabunna’s population can be attributed to a general recession that has strongly affected the base primary industries of agriculture and fishing. However, there has also been a decline in the associated manufacturing sector of value adding, and secondary processing. The following tables indicate the total number of persons employed in each sector, and this is then represented as a percentage of the total persons employed.
Table 4: Agriculture, Fishing & Forestry Sector - Spring Bay Region

<table>
<thead>
<tr>
<th>Year</th>
<th>Total of Persons Employed in Sector</th>
<th>Percentage of Total Workforce (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>158</td>
<td>20.6</td>
</tr>
<tr>
<td>1991</td>
<td>86</td>
<td>14.2</td>
</tr>
</tbody>
</table>

Source: ABS Urban Centres & Localities: Tasmania 1991

Table 5: Manufacturing Sector - Spring Bay Region

<table>
<thead>
<tr>
<th>Year</th>
<th>Total of Persons Employed in Sector</th>
<th>Percentage of Total Workforce (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>190</td>
<td>24.7</td>
</tr>
<tr>
<td>1991</td>
<td>127</td>
<td>20.9</td>
</tr>
</tbody>
</table>

Source: ABS Urban Centres & Localities: Tasmania 1991

It is interesting to note that both sectors experienced marked declines, whilst in the same period the total number of persons employed in the Glamorgan Spring Bay Local Government Area also declined from 768 in 1986 to 606 in 1991, a decrease of some 21%.

However, there has been an increase in the number of persons employed within the hospitality and associated services sector, as there is now an increasing emphasis and focus on tourism, ecotourism and tourist related activities. It is likely that the 1996 census will confirm these trends following detailed analysis of the data.

2.6 Early Oyster Exploitation

Historically speaking Spring Bay has played an important role in the establishment of an aquaculture industry in Tasmania. A large midden of oyster shells at Little Swanport, a legacy of local Aboriginals, is a lasting tribute to the quality and quantity of the local flat oysters (Ostrea angasi). By 1860 Spring Bay oysters were highly sought after, and it was said that the oyster beds could not be surpassed throughout the colonies in terms of their quantity and quality. Large quantities of these native flat oysters were being supplied to markets in Hobart and Melbourne.

However, in 1861 as a result of increased concerns as to the sustainability of the Spring Bay oyster beds, a petition was presented to the Legislative Council requesting that the management of the oyster beds be vested with the Spring Bay Municipal Council. Council Minutes (14 July 1864) state that the Warden was empowered to grant licences for oyster dredging seaward of a line from Freestone...
Point to Cuff’s Point (near One Tree Point) at a cost of £1 for each boat. In 1869 Mr Patton of Triabunna obtained from the local council a lease of two acres of water, on which he laid down 100,000 oysters.

In 1888, out of a fear that the oyster reserves were being diminished by both indiscriminate exploitation and by silting, oyster reserves for breeding purposes were successfully established at Spring Bay under the direction of Mr Saville-Kent, Superintendent and Inspector of Fisheries. As a result four areas each of two acres, were established in Spring Bay as oyster parks where the bivalves were successfully cultivated. In addition twenty two leases for oyster cultivation were granted in Spring Bay and marked on a Lands Department map of 1888.

In April 1966 Mr A M Olsen, with the permission of the Minister for Fisheries, laid out 1,200 Japanese (Pacific) oysters in the rocky foreshore of Spring Bay. These oysters formerly belonged to the CSIRO and were gathered from the Fisheries Division site at Pigeonhole Creek in the upper reaches of Pittwater. It was hoped that these Pacific oysters would act as brood stock for dispersion of the oyster larvae (spat) around the rocky foreshore of the Spring Bay area, thus providing a continuation of the naturally occurring resource. However, there has been little natural settlement of these oysters. There are large numbers of flat or native oysters in parts of the bay.

3. **Existing Marine Uses**

Existing and potential uses of the marine environment in Great Oyster Bay and Mercury Passage include shipping, recreation, tourism, marine farming and conservation, and commercial and recreational fishing.

The Marine and Safety Tasmania has provided charts showing the navigation channels to be maintained in the plan. These are shown on Map 4.

The east coast has high recreational value and is a popular destination for those undertaking activities such as sailing, boating, diving, surfing and recreational fishing. In particular, it attracts a high level of recreational use during the summer months when the local population is swollen with holiday makers.

Recreational fishing and recreational boating are popular pastimes in many of the waters on the east coast.
Recreational fishing is concentrated around those areas with easy access, including waters between Maria Island and the mainland. Other popular fishing spots are located out of Swansea, where an annual fishing contest is held, and out of Little Swanport. Many small beaches also allow access for fishers; day trips are the most frequent followed by short overnight trips. The waters are not sheltered in all weathers and care must be taken in the more open stretches of water during certain wind conditions. The favoured soft bottom species are flathead, whiting, perch and flounder. Gillnets are frequently used to catch trumpeter, silver trevally, salmon, pike, mullet and other reef or pelagic fish.

There are several estuaries, including Great Swanport and Little Swanport, where fishing for bream and flounder is popular. Squid are often caught in the shallow waters of sheltered bays and crayfish, abalone and scallops are also eagerly sought by recreational fishers. However there are a number of fishing restrictions in the area:

- no fishing within much of the marine component of the Maria Island National Park;
- no netting in Great Swanport, or in the Mercury Passage further than 200 m from the low water mark;
- no use of mullet nets in Great Oyster Bay north of an imaginary straight line drawn from the southern extremity of Freycinet Peninsula to Seaford Point;
- no use of mullet nets in Mercury Passage in an area bounded in the north by an imaginary straight line drawn from Cape Bougainville to Cape Boullanger and in the south by an imaginary straight line drawn from Cape Peron to Cape Bernier;
- no gummy sharks or school sharks are to be taken in Great Oyster Bay north of an imaginary straight line drawn from the southern extremity of Freycinet Peninsula to Seaford Point, as well as in those waters within a distance of 3 nautical miles from any part of the east coast commencing at Seaford Point and extending to an imaginary straight line drawn from Cape Bougainville to Cape Boullanger on Maria Island; and
- no gummy sharks or school sharks are to be taken in an area bounded in the north by an imaginary straight line drawn from Cape Bougainville to Cape Boullanger and in the south by an imaginary straight line drawn from Cape Peron to Cape Bernier.

Boat ramps and access points are located at Point Meredith, Swansea, two at Coles Bay, Swanwick, Yellow Sandbanks (in Great Swanport), Orford, Louisville, One Tree Point (Spring Bay), Triabunna and Little Swanport. The locations of these boat launching ramps are shown on Maps 10 to 16. There are other locations on small beaches where small boats may be launched.
The popularity of recreational boating is partly reflected in the number of moorings in the Spring Bay - Orford area. There are 204 registered moorings, and though some are used for commercial uses many are used by recreational boat owners.

The region includes the popular Freycinet National Park, where regular trips from the Lodge explore the coastline of the Park. Boat charter is available in the region and charter boats from Hobart may use the waters at various times. There is an annual cruising race, organised by the Cruising Yacht Club of Tasmania, which sails to Maria Island for a weekend. The area is included in the annual ‘Three Peaks’ race, which passes down the east coast and stops at Coles Bay, before going on to Hobart. Returning Sydney to Hobart race boats use Great Oyster Bay.

Daily trips to Maria Island are available from Louisville (Map 10) and boats trips are also available from Coles Bay, with two operators in the area.

The east coast's higher than average temperatures attract people using the waters for swimming, sail boarding, scuba diving and surfing.

There are many locations for recreational diving among the rocky inshore reefs. The most frequently used areas include the Freycinet National Park, the marine component of the Maria Island National Park, Swansea, Orford and Little Swanport. Diving is popular for collecting rock lobster, abalone and scallops as well as for sightseeing.

Like much of the Tasmanian coastline, the area has also been used for commercial fishing. The plan area was an important area for scallops, and large areas now form part of the Tasmanian Scallop Company Pty Ltd special lease.

Commercial fishing takes place out of Triabunna. The main species caught are silver trevally, blue eye, barracouta, mullet, wrasse, flathead, banded morwong, garfish, sharks, bastard trumpeter, stripey trumpeter, calamari, rock lobster and abalone. Clam fishing by diving occurs in Mercury Passage and commercial divers also collect sea urchins.

Commercial shipping in the plan area is concentrated in Spring Bay, with the export of woodchips being the main activity. Other commercial uses include the daily boat to Maria Island leaving from Louisville Resort in Spring Bay.

A number of areas set aside specifically for conservation are included in the plan boundaries. These include:

- Freycinet National Park;
- Maria Island National Park;
. Moulting Lagoon Game Reserve; and
. Coastal Reserves at Point Meredith, Coles Bay, Swansea, Coswell Beach, Cressy Beach, Kelvedon Beach, Mayfield Bay, Boltons Beach, Millingtons Beach, Raspins Beach.

In addition a coastal reserve extends around much of the plan area and provides some protection and control over foreshore uses.

A marine reserve has been established on the north-western end of Maria Island, extending approximately 1 km from the shore and covering 1500 ha. No fishing is permitted in the reserve between Darlington in the north and Return Point in the south.

**Whales and Dolphins**
The Great Oyster Bay and Mercury Passage areas are increasingly being used by dolphins and whales. The area is frequented by Common and Bottlenose Dolphins and forms part of the migratory path for Humpback and Southern Right Whales, as they move from the Southern Ocean feeding grounds to warmer waters for breeding.

The substantial areas of shallow and relatively warm water provide shelter and a rich food source for the Southern Right Whale and dolphins. The Southern Right Whale was hunted to near extinction, but recent evidence suggests that Great Oyster Bay is developing into one of two important calving and mating grounds for Southern Right Whales in the State. Since 1980 the number of sightings in Spring Bay has been increasing, and in 1989 a whale stayed for several days in the Shelley Beach area and a birth was reported at Reidle Bay. Increased boat traffic may have some effect on larger whales if the whale populations increase to levels seen in other areas of recovery.

4. **Marine Farming in Great Oyster Bay and Mercury Passage Area**

4.1 **Suitability for Marine Farming**
As stated previously, in the last century Spring Bay played an important role in the establishment of an aquaculture industry in Tasmania.

The region is suited to marine farming. 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;
the region is already established as a productive marine farming area, and operators have a wide range of experience in local conditions;

there is a skilled labour force available in the region and the local industry is willing to develop techniques and farming practices to deal with deep water conditions;

there are few major sources of pollution, with no major sources of pollution recognised in the northern part of the region; and

it contains areas suitable for the expansion of deepwater shellfish farming.

Limitations on the future growth of marine farming in the Plan area include:

the need to accommodate the expectations of other users of the area, including tourism and recreation;

summer water temperatures may rise above 18°C in parts of the area, making those areas unsuitable for salmonid farming;

the need for continued development of techniques suitable for the farming of shellfish in exposed deep water situations; and

the need to minimise conflicts with existing land use activities, including tourism, recreation, agricultural and residential activities.

possible problems with infrastructure and support services.

Established commercial and recreational navigation channels.

4.2 Existing Marine Farms
At present there are no marine farms in the area which produce finfish, and the existing shellfish production is concentrated on Pacific oysters, scallops and mussels. The location of the existing marine farming operations are illustrated with reference to Maps 5, 6 and 7.

In addition, abalone are produced in an on-land hatchery and grow-out facility drawing water from the sea, near Webber Point south of Swansea.

There are eight intertidal oyster leases, and five sub-tidal or deep water leases which produce oysters and mussels. Details on location, lease holder, business name, size of lease, and granting and expiry date of the individual leases are listed below in Table 6, whilst Table 7 has information on the species contained within each lease area.
<table>
<thead>
<tr>
<th>Location</th>
<th>Lease Holder (Business Name)</th>
<th>Lease No.</th>
<th>Size (ha)</th>
<th>Lease Granted/ Renewed</th>
<th>Lease Exp.</th>
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<tr>
<td></td>
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<td>1983</td>
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<td>1988</td>
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<td></td>
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<td>122</td>
<td>1.001</td>
<td>1988</td>
<td>1998</td>
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<td></td>
<td>M Johnson</td>
<td>8</td>
<td>20.04</td>
<td>1988</td>
<td>1998</td>
</tr>
<tr>
<td></td>
<td>AM Cole &amp; G Pickard</td>
<td>49</td>
<td>23.31</td>
<td>1978, 1988</td>
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<td>DI Melrose</td>
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<td>24.87</td>
<td>1978</td>
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<td></td>
<td>Aurora Trust</td>
<td>51</td>
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<td>2002</td>
</tr>
<tr>
<td></td>
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<td>1989</td>
<td>1999, 2019</td>
</tr>
<tr>
<td></td>
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<td>45.0</td>
<td>1988</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td>DI Melrose</td>
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<td>20.01</td>
<td>1989</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td>AM Cole &amp; G Pickard</td>
<td>158</td>
<td>5.0</td>
<td>1988</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td>Tasmanian Scallops Pty Ltd</td>
<td>Special</td>
<td>5101</td>
<td>1995</td>
<td>2015</td>
</tr>
</tbody>
</table>

Source: Department of Primary Industry & Fisheries (Tas)
Table 7: Species Licensed at Existing Marine Farms in the Plan Area

<table>
<thead>
<tr>
<th>Lease Holder</th>
<th>Location</th>
<th>Lease No.</th>
<th>PO</th>
<th>FO</th>
<th>CL</th>
<th>MU</th>
<th>AB</th>
<th>SC</th>
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<td></td>
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<tr>
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<tr>
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<tr>
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</tr>
<tr>
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<td>Great Oyster Bay</td>
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<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DI Melrose</td>
<td>Great Oyster Bay</td>
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<td>✓</td>
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</tr>
<tr>
<td>AM Cole &amp; G Pickard</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

PO Pacific Oyster
FO Flat Oyster
CL Clams
MU Mussel
AB Abalone
SC Scallop

Source: Department of Primary Industry & Fisheries (TAS).
4.3 Existing Infrastructure and Service Facilities

The marine farming industry in the area is serviced by local infrastructure. On-shore developments range from jetties and storage sheds to nursery facilities for the production of oysters and abalone (Maps 5,6,7).

Locations for on-shore facilities include:

- Coles Bay - shed and packing facility;
- Yellow Sandbanks - shed and packing facility;
- Great Swanport - shed and packing facility;
- Webber Point - abalone hatchery and growout facility;
- Little Swanport - sheds, packing facilities and a nursery;
- Triabunna - scallop handling and processing facilities.

Deep water leases are serviced by a range of vessels including punts and small boats.

The area is serviced by an existing road network and the product is road freighted to Hobart. Some product is road freighted to Devonport and shipped to markets on the mainland.

4.4 Tasmanian Scallops Pty Ltd

Scallop husbandry began in the area in 1988 as a joint venture of the Tasmanian Government in conjunction with the Scallop Enhancement and Research Program (SERP). In 1993 the program was taken over by Tasmanian Scallops Pty Ltd and the company runs spat collection, intermediate culture, hanging culture and reseeding in the arrangement. The arrangement previously operated under an exploratory licence which was changed to a special lease under the Marine Farming Planning Act 1995. The special lease arrangement does not confer exclusive occupation on the area which extends over a large part of Great Oyster Bay. Most of the area has been set aside for reseeding operations with a section for hanging culture in Mercury Passage between Maria Island and Triabunna. Presently the Commercial Scallop is the only species being farmed.

The company has provided employment opportunities in Triabunna and is seen as an important component of the local community.
5. **General Impacts of Marine Farming**

The impacts vary in their nature and intensity. The obvious visual and noise impacts arise from the operation of a marine farm. They include farm infrastructure, such as cages 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, however, are not so obvious, and coastal communities are concerned that long-term ecological damage may be occurring. They are also concerned that farming an introduced species of fish in unnaturally high densities could result in disease outbreaks affecting native fish stocks, or that an introduced species could become established in the wild as a pest.

In general terms the main impacts of marine farming have been well documented overseas, and there has been some limited research on the local environment (Gowen & Rosenthal 1993, Ritz et al. 1989). These impacts are divided into ‘ecological’ and ‘other’.

5.1 **Ecological Impacts**

*Fish and Fish Food*

a) **Finfish**

At present finfish farming has a greater impact on the environment than shellfish farming because of the addition of organic material, fish feed, which results in nutrients in the form of surplus food and excretory products being released to the sediments and waters. The impacts and possible detrimental effects of finfish farms on the environment are illustrated in Figure 1 (Smith and Haig, 1991). Solid wastes may accumulate on the sea bed, especially in areas of poor current flow, causing a change in the benthic community structure, while soluble nutrients released to the water column can increase the risk of toxic algal blooms.

In Tasmania the salmonid farming industry has a continuing investment in research on methods to improve its efficiency, which has also reduced the ecological impact of the farms. Less food but of better quality, is now given. The food conversion ratio (ratio of weight of dried food fed to the gain in wet fish weight) dropped from 1.8-2.0 to 1.4-1.5 in ten years. The constant improvement in feed quality and form and manner of feeding means that the amount of food being deposited on the bottom has been substantially reduced and this reduction continues.
Changes to the substrate ecosystem under a finfish farm have been documented in several studies, including some in Tasmania (Ritz et al. 1989). The changes are similar to, and consistent with, those caused by other forms of organic enrichment, such as wood pulp and domestic sewage. The increase in organic matter in the sediment leads to an increase in chemical oxygen demand and microbial activity, which can deplete the oxygen in the water overlying the sediment. There may also be a reduction of the oxygen in the sediment. This can be measured by the redox potential, the relative balance between oxidation and reduction in the sediments. Large reductions can result in sulphate reduction, producing hydrogen sulphide bubbles; methanogenic bacteria can cause these bubbles to also contain methane. This is commonly known as "outgassing".

Outgassing has not been a major problem in Tasmanian finfish farms, as it is controlled by feeding regimes and fallowing of the areas under cages. Experience with local conditions has enabled operators to establish the best feeding regimes for different localities and stock densities. However, the relationship between organic enrichment of the sediments and fish health is unclear (Gowen and Rosenthal 1993). Improved management strategies in Tasmania seek to ensure that organic loading in the sediment does not reach the level that can result in lower oxygen levels in the sediments and water column (T Dix, pers. comm.).

![Figure 1 - Potential Routes to Environmental Impacts Associated With Cage Fish Farming (Smith and Haig, 1991)](image)

In a study of the organic loading in and around a small finfish farm in the Huon estuary, a significant organic loading was found in the sediments outside the farm. The relatively high organic loading, and consequently higher than expected respiration rates, suggests that the source in this area is other than fish farms (Woodward et al. 1992). The changes in the organic loading in the sediment around
the farm were confined to an area less than 40 to 50 m from the centre of the cage (Woodward et al. 1992), which correlates with data from overseas work on finfish farms. Further studies on sediments under finfish farms at Nubeena confirm that the changes in the local marine environment are also confined to the proximity of the farmed area (Ritz et al. 1989). This supports the evidence that the impacts from finfish farming are confined to local changes in the physical characteristics of the sediments (Johannessen et al. 1994, Ye et al. 1991), which are reflected in changes in macrobenthic communities.

The macrobenthic fauna of the sediment changes in relation to the increased organic enrichment; this has been well documented in overseas and local studies (Pearson & Stanley 1979, Horwitz and Blake 1992, Johannessen et al. 1994, Ritz et al. 1989). A study has been undertaken through SALTAS to relate the redox potential and the macrofauna of the sediments under several finfish farms in Tasmania. This study should clearly indicate the importance of the relationship between sediment structure, redox levels and changes in community structure. “Sediment redox readings were observed to respond rapidly to changing levels of feed input” (MacLeod 1996).

The health of the macrobenthic community under finfish cages can be monitored by a method developed by Ritz et al. (1989), based on Warwick (1986). The "ABC" (abundance, biomass comparison) method relies on the relationship between changes in species diversity and population numbers, and the degree of disturbance of the environment. As the degree of disturbance increases, species diversity begins to decrease, while the numbers and biomass of opportunistic species increase. The biomass and abundance are plotted on a k-dominance curve for the communities under the finfish cages and the position and shape of the curve can be related directly to the degree of disturbance (Ritz et al. 1989).

This method enables the collection of a single sample to be used to judge whether a site is considered undisturbed, moderately disturbed or grossly disturbed and does not rely upon a baseline or control value. This method is particularly useful in estimating the health of the sediments at sites where there is no existing background data collected prior to the establishment of the marine farm. It can also be used to establish the degree of disturbance of a site prior to the establishment of a new marine farm.

Changes to the water column will result from the increases in soluble nutrients released from sediments, deposited faecal matter, uneaten food particles and excretory products from the fish. The changes in nutrient levels in waters can in turn cause changes in phytoplankton populations, not only in density but also in species composition.
Nutrient levels in the Huon River were also measured during the 1992 study already cited (Woodward et al. 1992). The results indicated that at most stations in the river, nitrate and nitrite concentrations limited phytoplankton production in the waters. Phosphates were the limiting nutrient in the upstream stations of the study where surface waters were fresh to brackish. Changes in nutrient concentrations near the farm reflected changes in the other sampling stations and did not appear to be related to the farm. It was concluded that, at the production level in the river as at 1992, the farms were making no significant contribution to the nutrient loading in the estuarine waters.

However, the overseas experience is that, at the current level of farming in coastal waters in most countries, large-scale hypernutrification is unlikely (Gowen and Rosenthal 1993), although there may be local increases in ammonia concentrations in some embayments. Generally, it was concluded that in coastal areas where phytoplankton growth is limited by light, or biomass is reduced by dilution, eutrophication is unlikely (Gowen and Rosenthal 1993).

Research conducted both overseas and in Tasmania on the effects of salmonid farming on the seabed has generally shown that organic build-up is greatest directly underneath a stocked cage and rapidly decreases with distance from the cage. In most studies, the seabed remained at normal conditions at a distance of 30 m from the edge of the cage. Studies have also shown that most previously farmed areas will approach normal conditions if left fallow for 3 to 6 months (Ritz et al. 1989; Gowan 1991).

b) Shellfish

Shellfish feed on microscopic algae 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.

As shellfish are totally reliant on food available in the water column, the productivity or level of production of algae in the growing area is important to the rate of shellfish growth and the number of fish that can be produced in an area. If there are too many shellfish in a particular area there may be insufficient food to feed all the farmed shellfish and the other filter feeding invertebrates. The Department of Primary Industry and Fisheries (DPIF) has conducted a study on “Predictive Modelling of Carrying Capacities of Oyster (Crassostrea gigas) Farming Areas in Tasmania”. This research aimed at developing predictive models that could
determine the number of oysters that could be cultured in an area without negatively affecting the growth rate of those oysters. Little Swanport, within the study area was included in the study but a predictive model has only been developed for Pittwater, in south east Tasmania.

Other studies on the productivity of the study area include those undertaken by CSIRO during the 1980s (See Page 4) which concluded that productivity of off shore areas was related to westerly wind stress and possibly related to the La Nina weather patterns (Harris et al, 1992).

The establishment of new shellfish farms around the State could lead to an increase in the spread of oyster spat, given the right temperature, salinity, currents and sediments.

In Tasmania, Pacific oysters spawn during the warmer summer months when water temperatures rise above approximately 18°C for several consecutive days. Spawning is influenced by a range of factors including salinity, dissolved oxygen, pH and various chemicals in the seawater (Hone, 1996). 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 three week planktonic stage 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 larvae to areas suitable for settlement.

Pacific oyster farming has been undertaken in Moulting Lagoon, Great Swanport since the 1970s when the area was selected for early growth trials. Settlement of spat and the establishment of wild populations of Pacific oysters is controlled by a wide range of physical and chemical parameters. Some of these conditions relate to currents, sediments, availability of suitable substrate, water chemistry, and possibly type and quantity of phytoplankton in the water column. The specific combinations determine if there is a successful spat settlement and if the population can establish and flourish. Given the long history of Pacific oyster production in Great Oyster Bay and the lack of established wild populations in Great Oyster Bay it may be confidently assumed that the suitable combination of conditions has not occurred in the area during the years of oyster farming.

Pacific oysters have a range of physical adaptations, including the ability to produce pseudofaeces and the ability to restrict the ingestion of inedible particles, which allow them to survive in areas of high turbidity. Such conditions would choke or smother the native oyster, *Ostrea angassi*, and it is therefore not surprising that the
Pacific oyster can tolerate dredging activities with limited mortalities while the native oyster is eliminated under these conditions (Hone 1996).

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).

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 to finfish culture, primarily because the shellfish make use of the existing plankton and particulate organic matter. Moreover, as shellfish productivity depends upon phytoplankton levels, changes in those levels due to nutrient enrichment from finfish farms may be mitigated by the presence of shellfish farms.

Results of sedimentation studies undertaken on intertidal oyster farms in South Australia did not detect any increase or decrease in the sediment associated with oyster leases (Hone, 1996). Preliminary work in Tasmania indicates that the biodeposition rate in the lease area depends on the characteristics of the water body, including natural changes in an estuarine system (Mitchell, pers comm).

Farmed Pacific oysters are only one of a number of filter feeders in the marine ecosystem. Evidence from a study in South Australia showed no detectable effect on the growth of cockles in an intertidal area, nor on razor fish (another shellfish species) (Hone, 1996). Stocking densities can be altered to maintain a high level of productivity from a site to suit the local conditions within the lease area. The work in South Australia suggests that the condition of farmed filter feeders is a good indicator of the productivity of an area. The planktonic composition of the food required for each species is also important in establishing the changes associated with farming of Pacific oysters. In Tasmania a study has shown that oysters feed on a range of phytoplankton, depending upon the stage of development (Tyler, 1988). This study also indicated that there was an ingestion of particulate matter and detritus, not simply phytoplankton. This is related to the physical characteristics of the Pacific oyster including the presence of pseudosiphons (Hone, 1996).

Changes in the phytoplankton composition of marine farming areas in the south of the State throughout one year were monitored in a University of Tasmania study
during 1993. The information obtained has been used to establish sites for continual monitoring to improve understanding of species composition fluctuations during the year, and the relationship of these fluctuations to algal blooms.

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

Chemicals used in farming finfish (for example, to treat diseases and net fouling) may have a substantial impact on the environment. Intertidal shellfish farms generally use wooden racks treated with preservatives, although these preservatives have not been found to accumulate in shellfish.

The use of chemicals has declined on Tasmanian salmonid farms. Copper-based net antifoulants were not cost-effective and have been replaced by regular manual changing and washing of nets. Very few chemicals or therapeutic substances are used because virtually none of the major salmonid diseases occur in Tasmania. In recent years antibiotics have been used irregularly in very small quantities and not at all on some farms.

Operational Wastes

Some aspects of the farming operations may affect water quality, such as fouling organisms from nets and other 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

The likelihood of disease outbreak increases when marine organisms are cultured at densities higher than normal in the wild. Often these diseases are naturally occurring and only manifest themselves when the fish are stressed and contained at high densities, but there is also the possibility of spreading exotic diseases to native fish stocks. Also, the transfer of farmed stock to various growing areas around the coast has the potential to spread diseases further afield.
Because of the number of debilitating diseases in salmonid-producing areas overseas, and the research on the spread of diseases and salmonid parasites, most farmers have accepted that salmonid farms must be separated by at least 1 km, but preferably more.

Fortunately, most of the major diseases and parasites of salmonids do not occur in Tasmania, possibly as a result of the relatively low stocking densities in the State. It has also been established that good management practices tend to limit the risk of diseases on marine farms. Due to the potentially large losses industry could sustain from disease, the industry is very conscious of the need for disease prevention. The Government through quarantine controls assists in this regard.

Species Escapes

Any species escaping from a marine farm will have some impact on the environment, such as the settlement of oyster spat on the foreshore from an oyster farm or fish releases from a fish farm.

Little is known about the impact of marine farms on the recreational fish populations in Tasmania. Anecdotal evidence suggests that marine farms possibly increase habitat sites for recreational fish species, with excess food from finfish farms another attraction. Mussel longlines provide shelter for smaller fish and flounder are reported in intertidal oyster farms. Mussel longlines in New Zealand can lead to increased natural fish stocks, with enhanced benthic fauna from sedimentation in some areas (Croft, 1994).

Recreational fishers surveyed in 1994 (G Double, pers. comm.) expressed the opinion that fewer recreational fish were being caught. However, this was happening not only in areas where there are marine farms. There is likely to be a number of causes, including overfishing and destruction or alteration of breeding habitat.

The impact of finfish that escape from marine farms has attracted little research. A study by the DPIF on salmon caught after an escape found the escaped salmon either had empty guts or soft material, such as pellets, and many of the fish were in poor condition (H Williams pers. comm.). An article in a sport fishing magazine described the excitement of catching salmon in the Huon River; the fish had empty guts but some were in breeding condition (Abbot, 1994).

Overseas evidence suggests that most escapees have few skills for survival in the wild: escaped fish in Canada have ignored schools of pile perch, anchovies and herring, and just cruised around waiting for pellets (Anon. 1989).
5.2 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 fish cages, buoys, feeding equipment, seal nets 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 DELM or the local government authority.

On-water Sheds

The mooring of floating structures such as storage facilities, shelters and grading facilities will not be allowed within a lease area except in accordance with licence conditions. However, these structures can also reduce environmental impact; for example, if used to store feed, they reduce marine traffic. If floating structures are approved in a lease area, the visual impact may be similar to a permanently moored vessel, provided activities on the structure produce minimal noise.

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 could 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 become visible. Deep-water shellfish leases will usually consist of parallel rows of buoys within a marked lease area. Finfish farms will generally be visible from the shoreline. They will
include fish cages of different sizes and placement patterns. The development of off-shore finfish farming may change the appearance of areas of coastline previously dominated by such a farm.

5.3 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

An access restriction that will impact on the public is that marine farmers are granted exclusive rights to the lease area, which prohibits the public from passing through or using that area. This could conceivably restrict the rights of recreational fishers, divers and swimmers who may have previously used the area. A special lease does not confer the right of exclusive occupation of the area covered by the special lease. Special lease areas generally allow access to the public with no restrictions on anchoring and navigation in the area.

5.4 Other Impacts

Noise

Several 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, feeding and processing equipment, generators, human activity and telephones/PA systems.

Debris

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

Predator Control

The control of predators on oyster farms is usually limited to netting of baskets or relocating native starfish. The main potential predators of finfish farms are seals. However, currently they rarely cause problems because heavy nets are used to exclude them from the cages. In some areas, seals are trapped and released to other waters. Fish cages are usually netted to exclude birds.
5.5 Predicted Impacts of Increased Marine Farming in the Plan Area

Preliminary surveys of proposed zones, undertaken by DPIF, provide basic environmental data, as outlined in the zone descriptions. Some basic environmental data was presented with original applications; these are also included in the zones descriptions. Management controls require baseline surveys and a benthic faunal analysis prior to the establishment of new farms or for significant expansions of existing farms.

The impacts from finfish farming in the area can be divided into several categories. The impact on sediments and the impact on the water column are the most obvious ecological impacts. Shellfish farming has less direct ecological impacts than finfish farming, as outlined in section 5.1 (Shellfish).

Other impacts from marine farming in the area include visual impact, changes to the general amenity of the area, impact on other water users, and 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, the large volumes and unrestricted water movements in the study area are sufficient to reduce any impacts to acceptable levels. Changes to the physical characteristics of sediments due to increased marine farming should remain local. The time taken for sediments to return to unfarmed conditions under finfish farms is expected to be similar to local and overseas experience. The research programs initiated by the DPIF have been developed to give a clearer indication of the impact of the existing industry and of changes that can be expected after an increase in production on new lease sites.

As with the prediction of any impact on the environment, there are limited guarantees. To mitigate or ameliorate the predicted impacts there is a range of management controls for marine farming. Marine farmers in the development plan area will be required to comply with these controls. Included in the management controls are provisions for collecting baseline environmental data and implementing on-going monitoring programs. These controls are designed to detect changes to the marine environment as a result of marine farming in sufficient time for management to be effective.
NOTE: The Great Oyster Bay and Mercury Passage MFDP October 1998 was modified in 2010 following a review of the plan in 2007. Four modifications were made to the plan including:

1. Creation of a new marine farming sub-zone in Little Swanport (Zone 6D).
2. Modification to marine farming Zone 6 (sub-zone 6C) in Little Swanport
3. Deletion of marine farming Zone 8 located offshore of Little Swanport
4. Minor modifications 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 coordinates and the subsequent area changes to zones.

The modifications are reflected in Section 2 - Development Proposals of the plan in Table 3 - Zones Identified by the Great Oyster Bay and Mercury Passage MFDP, zone summaries and Maps 8 to 21.

All other information contained in Section 2 - Development Proposals is from the original Great Oyster Bay and Mercury Passage MFDP October 1998 and should be considered in that context.

2. DEVELOPMENT PROPOSALS

1. Marine Farming Zones
Maps 8A, 8B and 8C show the zones designated for marine farming. Detailed maps of the zones designated for marine farming are illustrated in Maps 9 to 21.

Increases in shellfish production in the plan area can be achieved through:
- full development of existing leases;
- increasing lease sizes and the maximum leasable area in zones;
- increasing the area available for intertidal farming in Spring Bay; and
- increasing the area available for deepwater farming off the coast.

There is provision for finfish production in one zone in Okehampton Bay, near Triabunna.

The maximum leasable area for each zone indicates the maximum area that will be available for marine farming in the zone. For some zones the maximum leasable area will be close to the whole of the zones, though some allowance must be made for securing longlines and fish pens, as all marine farming equipment is to be included within the zone boundaries. In some zones the maximum leasable area is significantly different from the existing lease area, to allow for increased farming within the same location. In some zones the maximum leasable area has been restricted, due to physical parameters and
recognition of the interests of other marine activities. Zones enclosing intertidal shellfish leases in the marine farming development plan area may reflect the boundaries of the existing leases.

A marine farmer already operating in a zone may apply for increases in the existing lease up to the maximum leasable area in accordance with environmental and operational controls outlined in management controls and licence conditions. A marine farmer may also apply for another farm within the zone, provided the total farmed area in the zone does not exceed the maximum leasable area.

In areas where new zones have been created, maximum leasable areas have been set on the basis of experience. For new lease areas, a baseline environmental survey will be conducted before marine farming operations commence.

Zone areas are sufficient to allow all marine farming equipment to be located within the zone boundaries. There will be a proportion of a zone which is primarily occupied by mooring ropes and this will vary according to water depth, currents, tidal flows and the mooring system employed by the marine farmer. This generally means that the 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.

The species to be farmed have not been limited to those presently being farmed and the plan has allowed for possible new species to be included in the broad categories of finfish and shellfish. Species to be farmed have not been identified but include the broad categories of shellfish and seaweed for most zones, with finfish included for one zone. Water temperatures limit the production of existing farmed finfish species in the plan area. Seaweed has been included as a species to be farmed as there is the potential to grow seaweeds to enhance the production of abalone and reduce the need for wild harvesting of the required seaweeds. Such wild harvesting of seaweed must be minimised as much as is possible because of concerns over potential ecological impacts.

New zones have been allocated in Spring Bay, for intertidal shellfish farming, and for deep water farming south of Lachlan Island, at Okehampton Bay, and in sites outside Little Swanport. The largest zones have been allocated in the north of Great Oyster Bay to accommodate growth in the deepwater production of shellfish.

Four special lease areas (Maps 10, 11, 20 & 21) have been identified for the management of sea urchin populations. These special leases will not confer exclusive occupation of the areas but will allow the lessees to manage sea urchin populations to maximise the production of high grade sea urchins. Other activities, including the
commercial fishing of other species, will not be restricted in these areas. A fifth special lease area covers the area occupied by Tasmanian Scallops Pty Ltd.

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 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 Great Oyster Bay and Mercury Passage Marine Farming Development Plan are summarised in Tables 8 (a) & (b).

**Table 8(a) - Zones Identified by the Great Oyster Bay and Mercury Passage MFDP**

<table>
<thead>
<tr>
<th>Zone</th>
<th>Area (ha)</th>
<th>Species</th>
<th>Zone area (ha)</th>
<th>Maximum Leasable area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26.67</td>
<td>Shellfish, seaweed</td>
<td>26.67</td>
<td>18.0</td>
</tr>
<tr>
<td>2</td>
<td>14.37</td>
<td>Shellfish, seaweed</td>
<td>14.37</td>
<td>14.0</td>
</tr>
<tr>
<td>3</td>
<td>39.76</td>
<td>Shellfish, seaweed</td>
<td>39.76</td>
<td>30.0</td>
</tr>
<tr>
<td>4</td>
<td>203.5</td>
<td>Finfish, shellfish, seaweed</td>
<td>203.5</td>
<td>100.0</td>
</tr>
<tr>
<td>5</td>
<td>10.33</td>
<td>Shellfish, seaweed</td>
<td>10.33</td>
<td>5.0</td>
</tr>
<tr>
<td>6</td>
<td>60.27</td>
<td>Shellfish, seaweed</td>
<td>60.27</td>
<td>60.27</td>
</tr>
<tr>
<td>7</td>
<td>206.7</td>
<td>Shellfish, seaweed</td>
<td>206.7</td>
<td>100.0</td>
</tr>
<tr>
<td>9</td>
<td>244.8</td>
<td>Shellfish, seaweed</td>
<td>244.8</td>
<td>130.0</td>
</tr>
<tr>
<td>10</td>
<td>62.40</td>
<td>Shellfish, seaweed</td>
<td>62.40</td>
<td>50.0</td>
</tr>
<tr>
<td>11</td>
<td>590.5</td>
<td>Shellfish, seaweed</td>
<td>590.5</td>
<td>85.676</td>
</tr>
<tr>
<td>12A</td>
<td>1055.0</td>
<td>Shellfish, seaweed</td>
<td>1055.0</td>
<td>300.0</td>
</tr>
<tr>
<td>12B</td>
<td>892.4</td>
<td>Shellfish, seaweed</td>
<td>892.4</td>
<td>180</td>
</tr>
<tr>
<td>13</td>
<td>5105</td>
<td>Shellfish, seaweed</td>
<td>5105*</td>
<td>5105*</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* This area includes a special lease area of 3504 ha

**Table 8(b) - Zones Identified by the Great Oyster Bay and Mercury Passage MFDP**

<table>
<thead>
<tr>
<th>Special Lease Zones</th>
<th>Area of Special Lease</th>
<th>Zone area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Stapleton Point</td>
<td>10.74</td>
</tr>
<tr>
<td>15</td>
<td>Meredith Point</td>
<td>60.29</td>
</tr>
<tr>
<td>16</td>
<td>Lords Bluff</td>
<td>33.0</td>
</tr>
<tr>
<td>17</td>
<td>Christmas Island</td>
<td>30.93</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>134.96</strong></td>
</tr>
</tbody>
</table>
Zone 1 (Lachlan Island)

Location

The zone lies to the south of Lachlan Island in Mercury Passage between shallow sand banks. There are reefs to the east and the north of the island and the area is hazardous for navigation (See Map 9).

Environmental Conditions

The zone will be exposed to easterly weather and is surrounded by reefs and shallow sections of water. It is an area subject to strong tidal influences and this will need to be carefully considered in any farming operations.

The zone is predominantly over a firm sand substrate with water depth between 6 and 11 metres. A reasonable current was flowing at the time of surveying, with much drift weed observed (predominantly Undaria sp). A fringe of reef extends from the island to near the northern boundary of the zone. Quester tangent (a seabed mapping system) was used to obtain a bathymetric map of the zone. The area was also surveyed using a video drop where the seabed appeared to change.

A description of the video transects is given below with site numbers shown on the map of the zone.

Vertical Video Drop and Drift:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of bottom type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Relatively firm bare sand, occasional small pieces of drift weed, some shell debris; reasonable current flow across bottom.</td>
</tr>
<tr>
<td>2</td>
<td>Sand with some shell debris, large sections of drift weed, Undaria sp and Ecklonia radiata.</td>
</tr>
<tr>
<td>3</td>
<td>Sand with some shell debris, occasional seaweed attached to larger shell fragments either anchored in sand or drifting (eg, Undaria, Ulva sp, fragments of brown weed species), reasonable current flow.</td>
</tr>
<tr>
<td>4</td>
<td>Sand with some shell debris, occasional drift weed (Undaria sp, fragments of other brown weed species), filamentous strands visible in water column (‘marine snow’).</td>
</tr>
<tr>
<td>5</td>
<td>Reef, patchy rock/sand, predominantly Undaria sp but also other filamentous green weed, and Ulva sp).</td>
</tr>
</tbody>
</table>

Existing Use

There are no existing marine farms in the area however, commercial diving for clams takes place to the east of the zone.
Brief History

There has been no marine farming in the area although there is commercial fishing on reefs throughout the nearby waters.

Future Potential

There is potential for marine farming of certain species in the area using sub-surface equipment to withstand the weather conditions in the channel.

Navigation Channels and Safe Anchorages

The zone is close to navigation channels and will therefore need to be well marked. The markings will be to the satisfaction of the Marine and Safety Tasmania.

Marinas, Public Jetties and Other Public Facilities

There are no public facilities in the area and the area is inaccessible to the general public.

Surrounding Land Use

Lachlan Island is Crown Land, zoned Open Space. The island has navigational markings on it.

Sewage and Stormwater Outlets

There are no dwellings in the area.

Summary of Zone

The zone has been identified as suitable for marine farming, subject to certain conditions. It has been identified as potentially suitable for farming of abalone using sub-surface equipment. The Tasmanian Government has in place an Abalone Audit Plan for the effective management and control of both the wild and farmed abalone industries in Tasmania. The Audit Plan will be implemented through marine farming licence conditions which specify the conditions imposed on individual marine farmers depending upon the species being farmed and the method employed. Given the conditions of tidal movement and weather, it is unlikely to be suitable for any farming involving surface equipment. The zone area is 26.67 ha and the maximum leasable area is 18 ha. The species to be farmed are shellfish and seaweed.
Zone 1 consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>84</td>
<td>579957.52</td>
<td>5278071.11</td>
<td>42° 38.74' S</td>
<td>147° 58.523' E</td>
</tr>
<tr>
<td>85</td>
<td>580476.56</td>
<td>5278118.50</td>
<td>42° 38.7111' S</td>
<td>147° 58.9024' E</td>
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<tr>
<td>86</td>
<td>580385.71</td>
<td>5277581.57</td>
<td>42° 39.0017'S</td>
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</tr>
<tr>
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<td>579827.76</td>
<td>5277613.17</td>
<td>42° 38.9882'S</td>
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</tr>
<tr>
<td>84</td>
<td>579957.52</td>
<td>5278071.11</td>
<td>42° 38.74' S</td>
<td>147° 58.523' E</td>
</tr>
</tbody>
</table>

Mapping Grid of Australia
Zone 55 Coordinates
Zone 2 (Spring Bay West)

Location

Spring Bay is the bay upon which Triabunna is located and is a major port for the export of woodchips from Tasmania. It has a history based on fishing and presently supports the land based location of Tasmanian Scallops Pty Ltd which has rights to large areas of Great Oyster Bay for husbandry of scallops.

The zone is adjacent to the highway approach to the town. Some of the mudflats have been infilled and the remainder may be exposed during very low tide (See Map 10).

Environmental Conditions

The zone should be highly suitable for the production of intertidal oysters, given the tidal range and the substrate. The tidal range extends from approximately 0.8-1 m at low tide to 1.8-2.4 m at high tide and is slightly deeper than some of the existing intertidal areas. The depths marked on the map were measured at a 1.1 tidal depth. The area appears to be very similar to other estuarine growing areas in Tasmania in other respects.

The sediment is described as firm black to grey sand with some shellgrit. When surveyed there were no seagrass beds but there were numbers of small flat (native) oysters.

There are deeper channels in other sections of the mudflats that are used for anchorages. These are marked on Map 10.

Existing Use

There are no existing marine farms in the area. Part of the area adjacent is used for the anchoring of recreational vessels (See Map 10).

Brief History

There is no history of modern marine farming in the area, but there has been some reclamation work undertaken in the area. This has modified the intertidal area and created pasture suitable for cattle grazing. The area also has the remains of old fencing, indicating its previous use for grazing purposes.
Spring Bay was the site of some of the earliest attempts at marine farming in the State with leases granted by the local council last century for the production of the native oyster (the flat oyster, *Ostrea angasi*).

**Future Potential**

There is potential for farming intertidal shellfish, pending classification of the area under the Tasmanian Shellfish Quality Assurance Program (TSQAP) conducted by the Department of Health and Human Services.

The area has been identified as suitable for the relocation of part of Lease 18 from Little Swanport. Subject to the *Marine Farming Planning Act 1995*, part of Marine Farm 18 may be relocated to within Zone 2.

**Navigation Channels and Safe Anchorages**

The zone is away from recognised navigation channels and in a shallow intertidal area. There are some anchorages suitable for small recreational vessels in deeper channels within the tidal flats. These anchorage areas are not included in the proposed zone and are identified in Map 10.

**Marinas, Public Jetties and Other Public Facilities**

Spring Bay has a range of launching facilities and jetties. There is a public launching ramp to the south east of the zone at One Tree Point, and several jetties for commercial and recreational use further north in the bay.

**Surrounding Land Use**

The surrounding land is zoned Rural with some zoned Township to the northeast. Marine farming will be a permitted use in the Rural zone, under the draft Glamorgan Spring Bay Planning Scheme. There is a strip of ribbon development, Barton Avenue, south of the zone. This extends from One Tree Point to Bogan Creek, and is zoned Residential. To the north east of the zone there is a zone for conservation which includes a wetland area and some small islands to high water mark.

There are some houses along Barton Avenue and on the adjacent shoreline, where dwellings have an elevated view line. Dwellings in these areas may have some view of the proposed zone area. The bay is already subject to commercial and light industrial use.
Under the Triabunna Planning Scheme 1950 and the Spring Bay Planning Scheme 1989 within the Rural Zone aquaculture is a permitted as of right activity. Aquaculture is defined as ‘the growing and harvesting of fish in either onshore or offshore locations, and includes associated facilities such as storage, packing and handling sheds.’

The processing of fish would fall within the ambit of either the light or general industrial use categories and aquaculture would be undertaken in a zone which could facilitate such development.

Aquaculture is a discretionary use in the Recreation/Open Space zones under the existing planning schemes. The Glamorgan Spring Bay Council is presently preparing a new planning scheme in line with the State Coastal Policy.

Sewage and Stormwater Outlets

Sewage outlets in the area are connected to the local sewage system. Triabunna has a reticulated sewerage system with a relatively low population. The Council is currently disposing of treated effluent with spray irrigation to agricultural land and the golf course with a view to other land based re-use schemes in the near future.

There is a small stream to the south of the proposed zone which runs through agricultural land.

Summary of Zone

The zone has been identified as suitable for the intertidal farming of shellfish species, pending the classification obtained under the Tasmanian Shellfish Quality Assurance Program (TSQAP) conducted by the Department of Health and Human Services. It is presently proposed that the zone will be approximately 14.37 ha with a leasable area of 14 ha. Subject to the Marine Farming Planning Act 1995, part of Marine Farm 18 may be relocated to within Marine Farming Zone 2. The species to be farmed will be shellfish, and seaweed.

Zone 2 consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
<th>thence to</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>574614.43 E</td>
<td>5292497.25 N</td>
<td>42° 30.978' S</td>
<td>147° 54.4995' E</td>
<td>thence to</td>
</tr>
<tr>
<td>71</td>
<td>574476.12 E</td>
<td>5292474.94 N</td>
<td>42° 30.9908' S</td>
<td>147° 54.3986' E</td>
<td>thence to</td>
</tr>
<tr>
<td>72</td>
<td>574149.94 E</td>
<td>5292264.57 N</td>
<td>42° 31.1064' S</td>
<td>147° 54.1621' E</td>
<td>thence to</td>
</tr>
<tr>
<td>73</td>
<td>574163.82 E</td>
<td>5292082.33 N</td>
<td>42° 31.2048' S</td>
<td>147° 54.1736' E</td>
<td>thence to</td>
</tr>
<tr>
<td>74</td>
<td>574319.96 E</td>
<td>5292060.03 N</td>
<td>42° 31.216' S</td>
<td>147° 54.2878' E</td>
<td>thence to</td>
</tr>
<tr>
<td>No.</td>
<td>E</td>
<td>N</td>
<td>Lat</td>
<td>Long</td>
<td>Direction</td>
</tr>
<tr>
<td>-----</td>
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</tr>
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<td>574501.99</td>
<td>5292259.52</td>
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<td>thence to</td>
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<tr>
<td>77</td>
<td>574581.19</td>
<td>5292347.27</td>
<td>42° 31.0592'S</td>
<td>147° 54.4764'E</td>
<td>thence to</td>
</tr>
<tr>
<td>78</td>
<td>574619.41</td>
<td>5292220.03</td>
<td>42° 31.1278'S</td>
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<tr>
<td>70</td>
<td>574614.43</td>
<td>5292497.25</td>
<td>42° 30.978'S</td>
<td>147° 54.4995'E</td>
<td></td>
</tr>
</tbody>
</table>

Mapping Grid of Australia
Zone 55 Coordinates
Zone 3 (Spring Bay-Horseshoe Shoal)

Location

Spring Bay is the bay upon which Triabunna is located and is a major port for the export of woodchips from Tasmania.

The zone proposed for marine farming is an intertidal and deep water area on the eastern side of the bay (See Map 10). Spring Bay presently has a range of maritime activities taking place around its shores and in the bay. There are also some sections which are zoned for light industrial use.

Environmental Conditions

The zone should be suitable for the production of intertidal oysters, and some deep water culture given the tidal range and the substrate. Most of the zone is slightly deeper than the normal intertidal areas and includes a deep hole of approximately 8-9 m on the outer edge of the zone. This area will be suitable for longline culture. The edge of the zone drops away quickly to the main channel of the bay. The zone is bounded near the outer edges by a shallow sand bar which is almost exposed at low tide. The area between the bar and the shore varies in depth at a 1m tide between 1.1m and 1.8m. The depths shown on the map were measured at approximately a 1m tide.

A small stream discharges in the bay at the south eastern corner of the zone with limited freshwater entering the bay.

The sediment is described as firm black to grey sand on the inshore side of the zone with coarse sands towards the outer edge of the zone. There are patches of small scattered rocks and some macroalgae attached. Some macroalgal species, including Homosiria banksia and a filamentous green algae were in the drift weed. Shellgrit is present in the coarse sand with abundant native (flat) oyster shells present. Many of these were oyster shells not living fish. These oysters are presently not being harvested commercially.

There were no seagrass beds present in the zone.

Existing Use

There are no existing marine farms in the area.
Brief History

There is no recent history of marine farming in the area although Triabunna was the site for early efforts at shellfish farming in the last century.

Future Potential

There is potential for farming shellfish pending the classification obtained under the TSQAP conducted by the Department of Health and Human Services (DHHS). If it does not meet the DHHS's requirements it may still be an area suitable for growing juvenile oysters as a restricted area. Shellfish grown here would require a further period on another lease prior to sale for human consumption.

Part of this zone has been identified as providing the potential for the relocation of part of Lease 18 from Little Swanport. Subject to the provisions of the Marine Farming Planning Act 1995, part of Lease 18 may be relocated to Zone 3. There will be some area available for allocation as new water following the completion of the draft plan. The separation distance between lease areas will be by negotiation between the lease holders and the Minister.

Navigation Channels and Safe Anchorages

The zone is clear of recognised navigation channels and in a shallow intertidal area.

Marinas, Public Jetties and Other Public Facilities

Spring Bay has a range of launching facilities and jetties. Several jetties for commercial and recreational use are located further into the bay.

Surrounding Land Use

The surrounding land is zoned Rural.

It is close to the woodchip mill and also the landing facilities for TasCray and Tasmanian Scallops Pty Ltd.

Under the Triabunna Planning Scheme 1950/Spring Bay Planning Scheme 1989 aquaculture is a permitted as of right activity within the Rural zoning. Aquaculture is defined as ‘the growing and harvesting of fish in either onshore or offshore locations, and includes associated facilities such as storage, packing and handling sheds.’
The processing of fish would fall within the ambit of either the light or general industrial use categories and would be undertaken in such zones that facilitate industrial development.

Under the existing planning schemes aquaculture is a discretionary use within Recreation/Open Space zones. The Glamorgan Spring Bay Council is presently preparing a new planning scheme in line with the State Coastal Policy.

**Sewage and Stormwater Outlets**

Triabunna has a reticulated sewage system with a relatively low population. The Council is currently disposing of treated effluent with spray irrigation to agricultural land and the golf course with a view to other land based re-use schemes in the near future.

**Summary of Zone**

The zone has been identified as suitable for the intertidal farming of shellfish species, pending the classification obtained under TSQAP. The zone will be approximately 39.76 ha with a leasable area of 30 ha.

Subject to the provisions of the *Marine Farming Planning Act 1995*, part of Lease 18 may be relocated to Zone 3. The balance of the leasable area in the zone will be available for allocation as new lease area. The separation distance between lease areas will be by negotiation between lease holders and the Minister.

The species to be farmed will be shellfish and seaweed.

**Zone 3 consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:**

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>118</td>
<td>575720.06 E</td>
<td>5291605.81 N</td>
<td>42° 31.4532'S</td>
<td>147° 55.3141'E</td>
</tr>
<tr>
<td>119</td>
<td>575632.10 E</td>
<td>5291600.69 N</td>
<td>42° 31.4565'S</td>
<td>147° 55.2499'E</td>
</tr>
<tr>
<td>120</td>
<td>575557.20 E</td>
<td>5291477.44 N</td>
<td>42° 31.5235'S</td>
<td>147° 55.1961'E</td>
</tr>
<tr>
<td>121</td>
<td>575647.84 E</td>
<td>5291326.80 N</td>
<td>42° 31.6043'S</td>
<td>147° 55.2635'E</td>
</tr>
<tr>
<td>122</td>
<td>575479.37 E</td>
<td>5291279.97 N</td>
<td>42° 31.6307'S</td>
<td>147° 55.1408'E</td>
</tr>
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<td>123</td>
<td>575415.01 E</td>
<td>5291212.39 N</td>
<td>42° 31.6675'S</td>
<td>147° 55.0943'E</td>
</tr>
<tr>
<td>124</td>
<td>576037.74 E</td>
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<td>125</td>
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<td>5290669.26 N</td>
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<td>147° 55.5953'E</td>
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<td>126</td>
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<td>42° 31.8672'S</td>
<td>147° 55.7516'E</td>
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<td>576108.41 E</td>
<td>5291057.32 N</td>
<td>42° 31.7473'S</td>
<td>147° 55.6021'E</td>
</tr>
<tr>
<td>128</td>
<td>575994.31 E</td>
<td>5291395.62 N</td>
<td>42° 31.5652'S</td>
<td>147° 55.516'E</td>
</tr>
</tbody>
</table>
129  575746.09 E  5291499.72 N  42°31.5104'S  147°55.3339'E  thence to
118  575720.06 E  5291605.81 N  42°31.4532'S  147°55.3141'E

Mapping Grid of Australia
Zone 55 Coordinates
Zone 4 (Okehampton Bay)

Location

Okehampton Bay zone is located in Okehampton Bay and extends towards the south east. It is approximately 700 m from the beach at Okehampton and 500 m from the cliffs towards Lords Bluff (See Map 11).

Environmental Conditions

The zone will have some protection from northerly weather. Water temperatures are considered suitable for farming finfish during most summer periods. Water temperatures in the area have been recorded over a number of summers, within an annual range of 8.5-23.5°C. The area may be influenced during some summers by the tropical water currents that move down the east coast from northern Australia.

The zone has relatively uniform sand substrate type, with numerous spiral (screw) shells *Maoricolpus roseus*. Water depth within the zone ranges from 22-28 metres. A region of reef was identified in the northern part of the bay, which is outside the zone boundary.

Results of the sediment samples and a description of the video footage record are given below, with site numbers shown on the map of the zone. The location of the starting points of the video drops are also shown on the map.

Sediment Samples:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of sediment type, colour &amp; texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (cnr a)</td>
<td>Relatively fine sand with fine shell grit, dark greenish grey. One small ridged bivalve, no seaweed in grab.</td>
</tr>
<tr>
<td>2 (cnr d)</td>
<td>Moderately coarse shell grit with sand. Numerous spiral shells (<em>Maoricolpus roseus</em>), some live, others with small hermit crabs. Two blood clams (<em>Eucrasatella kingicola</em>), two <em>Katylesia</em> sp, small piece of rock.</td>
</tr>
<tr>
<td>3 (cnr c)</td>
<td>Relatively fine sand with some fine shell grit, dark greenish grey. One heart urchin (<em>Echinocardium cordatum</em>), one small bivalve (live), one live <em>M. roseus</em>.</td>
</tr>
<tr>
<td>4 (cnr b)</td>
<td>Relatively fine sand with some fine shell grit, dark greenish grey. Several small spiral shells (<em>M. roseus</em>).</td>
</tr>
</tbody>
</table>

Video sledge tow (VA-VB) and vertical video drops with drift (V1-V7):

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of bottom type</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA-VB</td>
<td>Sand bottom with sparse vegetation cover, occasional sponges, flathead. Patches of occasional spiral shells.</td>
</tr>
<tr>
<td>V1</td>
<td>Sand with some shell debris visible, very sparse vegetation.</td>
</tr>
<tr>
<td>V2</td>
<td>Sand with numerous spiral shells (<em>M. roseus</em>) either buried or lying on sediment surface. Occasional large piece of drift weed (brown), occasional burrows and mounds observed.</td>
</tr>
<tr>
<td>V3</td>
<td>Sand bottom with shell grit, sponges and patchy “low weed”, approximately 20-45% variable cover; <em>M. roseus</em> shells (clusters small in number), burrow holes, a banded stingaree (<em>Urolophus</em>...</td>
</tr>
</tbody>
</table>
cruciatus). Drifting into sand with sparse vegetation cover.

V4 Sand with some shell debris, very sparse vegetation cover; piece of Undaria drift weed.

V5 Sand, sparse patchy “low weed” approximately, 10-20% cover; numerous M. roseus mostly buried though some lying on surface, flathead, some larger pieces of brown drift weed.

V6 Coarser sand with more shell grit/debris, low ridged bottom; sponges, occasional low seaweed species and shells (predominantly M. roseus) in troughs. Drifting from sand onto harder bottom, loose rocks with moderate sponge cover (varied types), numerous spiral shells (M. roseus), often in quite dense patches. Moving onto larger rock/boulders with much sponge cover of many different types (fan shaped, rounded, branched) with very dense covering of M. roseus shells on and between rocks. Very few tall seaweed plants observed, mostly sponges.

V7 Hard rock bottom (rock, boulders and rubble), dense number of sponges of many different types, numerous spiral shells (M. roseus), occasional scallop valve, occasional tall macroalgae (? Ecklonia radiata), several fish observed (leatherjacket, wrasse, butterfly perch).

Existing Use

There are no existing marine farms in the area, but the area around the coast is used for commercial and recreational fishing.

Brief History

There is no previous history of marine farming in the area. There is some history of commercial wild fishing taking place inshore for rock lobster and pelagic species.

Future Potential

There is the potential for farming shellfish and finfish in the area. There may be scope for the production of salmon and sea grown trout. The trout could be produced to commercial size during one growing period due to the slightly higher water temperatures on these regions. However, freshwater bathing of the finfish for control of gill amoeba may be a problem in the area.

Navigation Channels and Safe Anchorages

The zone is not in any navigation channels and there are no recognised safe anchorages in the area. Some sections of the bay closer inshore are used by some recreational boat owners and it is used as an emergency anchorage for commercial fishermen.

Marinas, Public Jetties and Other Public Facilities

There are no public facilities in the area and the area is inaccessible to the general public.
Surrounding Land Use

The surrounding land is zoned Rural. There is a small section of private land which is used as a caravan area during the summer months although the land is primarily rural. There is a small marsh area behind the beach front at Okehampton Bay.

Sewage and Stormwater Outlets

There are no stormwater or sewage outlets in the area. There are some residences inland which dispose of sewage in septic tanks with in ground disposal for caravan effluent.

Summary of Zone

The zone has been identified as suitable for the farming of a range of shellfish species, including oysters, mussels, scallops and abalone, and for finfish. The zone size would be approximately 203.5 ha with a maximum leasable area of 100 ha. The species to be farmed will be finfish, shellfish and seaweed.

Zone 4 consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
<th>thence to</th>
</tr>
</thead>
<tbody>
<tr>
<td>66</td>
<td>580332.61</td>
<td>5291752.28</td>
<td>42° 31.3462'S</td>
<td>147° 58.6819'E</td>
<td>thence to</td>
</tr>
<tr>
<td>67</td>
<td>579332.54</td>
<td>5290142.25</td>
<td>42° 32.2222'S</td>
<td>147° 57.9648'E</td>
<td>thence to</td>
</tr>
<tr>
<td>68</td>
<td>580392.57</td>
<td>5289732.22</td>
<td>42° 32.4371'S</td>
<td>147° 58.7427'E</td>
<td>thence to</td>
</tr>
<tr>
<td>69</td>
<td>581332.56</td>
<td>5290702.29</td>
<td>42° 31.9072'S</td>
<td>147° 59.4212'E</td>
<td>thence to</td>
</tr>
<tr>
<td>66</td>
<td>580332.61</td>
<td>5291752.28</td>
<td>42° 31.3462'S</td>
<td>147° 58.6819'E</td>
<td></td>
</tr>
</tbody>
</table>

Mapping Grid of Australia
Zone 55 Coordinates
Zone 5 (Grindstone)

Location

Grindstone zone is located north of Grindstone Point, just north of Grindstone Bay (See Map 12). Eighty Acre Creek opens into the bay through an extensive lagoon which is periodically closed to the sea. The lagoon has been identified as an important waterfowl roosting site.

Environmental Conditions

The point will provide some protection for the zone from southerly weather. The depth ranges from 9-12 m; the zone is located approximately 160 m from the nearest shoreline.

The sediment is described as sand with shell grit/debris and very sparse vegetation although there were patches of "bull weed". There are patches of rocky reef at the various sites identified on Map 12. The reef areas are predominantly covered by Phyllospora comosa and Ecklonia radiata.

To the east of the zone, areas of reef were identified.

A description of the video footage record is given below; site numbers are shown on Map 12.

Vertical Video Drop and Drift

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of bottom type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (9.0 m)</td>
<td>Reef, rocky bottom with reasonably dense vegetation cover, predominant macroalgae species being Ecklonia radiata, Phyllospora comosa and Caulerpa sp. A wrasse observed.</td>
</tr>
<tr>
<td>2 (11.8 m)</td>
<td>Sand, reasonably bare with the exception of segments of drift weed.</td>
</tr>
<tr>
<td>3 (8.2 m)</td>
<td>Sand with some shell grit/debris, very sparse vegetation cover. Drifting into rocky reef, dense macroalgae cover, predominantly P. comosa and E. radiata; fringe of reef, drifting onto bare ridged sand.</td>
</tr>
</tbody>
</table>

As there are small patches of reef near the zone it will be a requirement that the lease area is to be located only over sand.

Existing Use

There are no existing marine farms in the area.

There is a large reef area to the south east of the mouth of the lagoon, Mimosa Reef, which is used for rock lobster fishing.
Brief History

There is no history of marine farming in the area but adjacent reef areas have supported commercial wild fishing including rock lobster fishing.

The area may meet the future requirements for activities associated with rock lobster farming. The potential for farming this species is currently the subject of urgent investigation by the Tasmanian State Government.

Future Potential

There is potential for farming shellfish. The zone may provide suitable areas for the growout of rock lobsters in the future if marine farming of the species takes place.

Navigation Channels and Safe Anchorages

The zone is not in navigation channels and is clear of the safe anchorage at the mouth of the lagoon. This provides good protection for fishing vessels working the area of Mimosa Reef during south to south easterly weather conditions.

Marinas, Public Jetties and Other Public Facilities

There are no public facilities in the area and the area is inaccessible to the general public.

Surrounding Land Use

The surrounding land is zoned Rural and marine farming is a permitted use in this zone under the draft Glamorgan Spring Bay Planning Scheme.

Sewage and Stormwater Outlets

There are no stormwater or sewage outlets in the area.

Summary of Zone

The zone has been identified as suitable for the farming of a range of shellfish species, including oysters, mussels, scallops and abalone, and may prove suitable for activities associated with rock lobster farming. The potential for farming this species has yet to be accurately identified. The zone is adjacent to reef areas and prior to the establishment of any lease detailed baseline environmental data will need to be
The area of the zone is 10.33 ha with a maximum leaseable area of 5 ha. The species to be farmed will be shellfish and seaweeds.

Zone 5 consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

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<tr>
<th>ID</th>
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<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>582010.54 E</td>
<td>5302580.82 N</td>
<td>42° 25.4852'S</td>
<td>147° 59.8144'E</td>
</tr>
<tr>
<td>81</td>
<td>582313.44 E</td>
<td>5301924.30 N</td>
<td>42° 25.838' S</td>
<td>148° 0.04098'E</td>
</tr>
<tr>
<td>82</td>
<td>582453.29E</td>
<td>5301964.07 N</td>
<td>42° 25.8155'S</td>
<td>148° 0.14256'E</td>
</tr>
<tr>
<td>83</td>
<td>582153.47 E</td>
<td>5302614.28 N</td>
<td>42° 25.4662'S</td>
<td>147° 59.9184'E</td>
</tr>
<tr>
<td>80</td>
<td>582010.54 E</td>
<td>5302580.82 N</td>
<td>42° 25.4852'S</td>
<td>147° 59.8144'E</td>
</tr>
</tbody>
</table>

Mapping Grid of Australia
Zone 55 Coordinates
Zone 6 (Little Swanport)

Location

Little Swanport is located on the western side of Great Oyster Bay, approximately 30 km south of Swansea and 20 km north of Triabunna. It forms the estuary of the Little Swanport River. Three farms are currently located in this estuary; two near the entrance to Great Oyster Bay and a third in Freshwater Bay (See Map 13).

There is a small subdivision development on the northern side of the estuary. One fisherman operates out of the estuary.

Environmental Conditions

Little Swanport has a complex hydrography due to its narrow entrance, long channel, numerous shoals and the irregular shape of the estuary. Water circulation around the estuary is also complex, being largely wind driven. The complexity is accentuated during times of flooding of the Little Swanport River (Wilson 1990, DPIF files). At peak times the upper reaches of the estuary are inundated by freshwater, causing oysters to die.

There is a bar across the estuary mouth which moves over time and changes the ease with which vessels navigate the area.

The substrate consists of sand near the mouth and changes to mud higher up the estuary, with seagrass beds throughout.

Little Swanport supports large populations of wild native oysters, mussels, clams and barnacles (Wilson 1990 DPIF files).

Productivity studies have been undertaken by the DPIF to develop a model for the prediction of carrying capacity of oyster growing areas in the State. The study was undertaken with a Fisheries Research and Development Corporation (FRDC) grant 92/54 and produced a report “Predictive Modelling of Carrying Capacities of Oyster (Crassostrea gigas) Farming Areas in Tasmania”(DPIF 1996). Although no predictive model was produced for Little Swanport the study produced some basic data on the chemistry of the area. These indicate chlorophyll levels within the range of 0.5 - 4 µg/L; peaks approaching bloom conditions occur periodically, generally following heavy rain events. There were slightly lower phosphate values in Little Swanport than in other oyster growing areas studied.
Chlorophyll a concentrations, however, are not always a good indicator of food available for oysters, because the oysters may select particular sizes and species of phytoplankton, or the phytoplankton may be of low nutritional value (DPIF 1996). Chlorophyll a concentrations in the water column were also found to be an overestimate of total available food in Little Swanport (Van der Enden, 1994) because the oysters were selectively feeding on benthic diatoms and plant detritus, particularly from seagrass (Zostera sp.).

At Little Swanport there were no apparent changes in nutrient concentrations around the leases, other than for a tendency for chlorophyll a concentrations to be higher at the observation stations furthest up the estuary.

There are concerns about the growth of rice grass in the northern end of the estuary. Ricegrass has had some effects on the fauna in the area. It is estimated that there are 15 ha of rice grass in the estuary. The rice grass encroaches around intertidal areas and therefore has the potential to impact on the wildlife of the lagoon.

The estuary supports a large population of bird life including black swans, pied oyster catchers and other wading species.

Existing Use

This zone incorporates 3 marine farm leases: No's 18, 52 and 86.

The information on the existing farms is:

**Farm No. 18**
- Area: 52.7 ha
- Granted in: 1978, Renewed 1992
- Duration: 20 years
- Species: Oysters
- Holder: Southern Cross Marine Culture

**Farm No. 52**
- Area: 10.32 ha
- Granted in: 1983
- Duration: 20 years
- Species: Oysters
- Holder: Dyke CR & SP

**Farm No. 86**
- Area: 16.817 ha
- Granted in: 1986, Renewed in 1992
- Duration: 20 years
- Species: Oysters
Brief History

Little Swanport has been used for marine farming since the first leases were granted in 1969/70. Further leases were granted in the 1980s with navigation channels through the estuary kept open. The boundaries of leases were difficult to resolve but the matter was finally settled in 1992.

In late 1988 management strategies overcame problems associated with polychaetes, which caused blistering on some of the oysters.

The estuary is considered a reasonably productive area, with highest production levels on leases closest to the entrance of the estuary. On the lease further up the estuary there are intermittent problems associated with freshwater input.

Concerns have been expressed over the capacity of the Little Swanport estuary to carry an increase in bivalve mollusc farming without detriment to shellfish production in existing lease areas.

Future Potential

The plan does not provide for any increase in area leased for shellfish farming in the estuary. Further, the plan provides for a reduction in the area leased for shellfish farming in the estuary. Subject to the provisions of the Marine Farming Planning Act 1995, that part of Marine Farm Lease 18, amounting to some 20ha, lying outside the zone, may be relocated to areas within Marine Farming Zones 2 and 3, in Spring Bay. The plan also provides for part of the existing leases to be used as shellfish nursery areas.

Navigation Channels and Safe Anchorages

The sub-zones are not in any commercial navigation channels but there is a recognised anchorage inside the estuary. There is a navigation channel for small craft between the two sections of Farm No 86.

Some sections of the estuary are used for boating, water skiing and fishing.

Marinas, Public Jetties and Other Public Facilities

There is a public boat ramp and jetty on the northern side of the estuary. There are several launching ramps associated with the marine farms in the area.
Surrounding Land Use

The land surrounding the estuary is primarily rural with some subdivision on the northern side of the estuary. The subdivision is zoned rural residential and the remaining land is zoned Rural. Aquaculture is a permitted use in the Rural zone, under the draft Glamorgan Spring Bay Planning Scheme.

The Little Swanport estuary is acknowledged as having perhaps the greatest known concentrations of shell middens in the region. The area appears to have been used as an estuarine shell fishing camp to which flaked stone tools were brought. The middens are most extensive on the southern shoreline, where they cover many acres, with dense extension inland up to 300 m. Large sections of this area have been used by commercial lime burners (Lourandos, 1970). The middens also extend along the northern shore of the estuary, including Jacks Island. Studies into the middens were undertaken by various people including excavations during 1969-70 as part of postgraduate studies for the Australian National University. Part of the middens on the northern bank of the estuary have been placed on the National Estate Register and are known as Jacks Island area.

Sewage and Stormwater Outlets

There are no stormwater or sewage outlets in the area. The discharge for the subdivision is accommodated by septic tanks.

Summary of Zone

Sub-Zone 6A

The area of Sub-Zone 6A is 16.817 hectares and the maximum leaseable area is 16.817 hectares. The categories of fish permitted for culture within Sub-Zone 6A, subject to the provisions of a marine farming licence, are shellfish and seaweed.

Sub-Zone 6A consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>581224.91E</td>
<td>5315106.71N</td>
<td>42° 18.7226'S</td>
<td>147° 59.1356'E thence to</td>
</tr>
<tr>
<td>181</td>
<td>581281.22E</td>
<td>5315081.36N</td>
<td>42° 18.736'S</td>
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</tr>
<tr>
<td>182</td>
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<td>5315057.46N</td>
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<td>581390.06E</td>
<td>5315032.76N</td>
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</tr>
<tr>
<td>184</td>
<td>581455.35E</td>
<td>5314976.36N</td>
<td>42° 18.7916'S</td>
<td>147° 59.3045'E thence to</td>
</tr>
<tr>
<td>185</td>
<td>581524.81E</td>
<td>5314586.16N</td>
<td>42° 19.0037'S</td>
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<tr>
<td>186</td>
<td>581243.62E</td>
<td>5314596.26N</td>
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<tr>
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</tr>
<tr>
<td>188</td>
<td>581266.84E</td>
<td>5314807.68N</td>
<td>42° 18.8839'S</td>
<td>147° 59.1686'E thence to</td>
</tr>
</tbody>
</table>
Sub-Zone 6B

The area of Sub-zone 6B is 32.8755 hectares and the maximum leaseable area is 32.8755 hectares. The categories of fish permitted for culture within Sub-Zone 6B, subject to the provisions of a marine farming licence, are shellfish and seaweed.

Sub-Zone 6B consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
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</tr>
<tr>
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<td>581226.44 E</td>
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<td>147° 59.1416'E</td>
</tr>
<tr>
<td>19</td>
<td>581271.23 E</td>
<td>5314573.58</td>
<td>42° 19.0103'S</td>
<td>147° 59.1739'E</td>
</tr>
<tr>
<td>20</td>
<td>581421.92 E</td>
<td>5314884.85</td>
<td>42° 18.8413'S</td>
<td>147° 59.2809'E</td>
</tr>
<tr>
<td>21</td>
<td>581526.18 E</td>
<td>5315062.11</td>
<td>42° 18.7448'S</td>
<td>147° 59.3553'E</td>
</tr>
<tr>
<td>22</td>
<td>581674.93 E</td>
<td>5314917.58</td>
<td>42° 18.8219'S</td>
<td>147° 59.4648'E</td>
</tr>
<tr>
<td>23</td>
<td>581715.13 E</td>
<td>5314878.51</td>
<td>42° 18.8428'S</td>
<td>147° 59.4944'E</td>
</tr>
<tr>
<td>24</td>
<td>581585.71 E</td>
<td>5314790.51</td>
<td>42° 18.8912'S</td>
<td>147° 59.401'E</td>
</tr>
<tr>
<td>25</td>
<td>581576.91 E</td>
<td>5314762.52</td>
<td>42° 18.9064'S</td>
<td>147° 59.3948'E</td>
</tr>
<tr>
<td>26</td>
<td>581563.61 E</td>
<td>5314690.51</td>
<td>42° 18.9454'S</td>
<td>147° 59.3857'E</td>
</tr>
</tbody>
</table>
Sub-Zone 6C

Sub-Zone 6C is located in Freshwater Bay and Luttrells Bay and is approximately 10 metres from the coastline at its closest point.

Map 13 depicts Sub-Zone 6C.

The zone consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:
The area of Sub-Zone 6C is approximately 10.32 hectares. The maximum leasable area within Sub-Zone 6C is 10.32 hectares.
Categories of fish
The categories of fish permitted for culture within Sub-Zone 6C, subject to the provisions of a marine farming licence, are shellfish and seaweeds.

Management Controls
The management controls applying to Sub-Zone 6C are stipulated in the Great Oyster Bay Marine Farming Development Plan October 1998.

Special Provisions
Subject to the provisions of the Marine Farming Planning Act 1995 it is the planning intention to provide for the relocation of marine farming Lease No. 52 to an area within Sub-Zone 6C in Luttrells Bay.

Sub-Zone 6D
Sub-Zone 6D is located on the northern shoreline of Little Swanport estuary, opposite Freshwater Bay, and touches the coastline.

Map 13 depicts Sub-Zone 6D.

Sub-Zone 6D consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>154</td>
<td>579740.18 E</td>
<td>5312703.52 N</td>
<td>42° 20.0302'S</td>
<td>147° 58.0747'E</td>
</tr>
<tr>
<td>155</td>
<td>579751.85 E</td>
<td>5312752.80 N</td>
<td>42° 20.0035'S</td>
<td>147° 58.0828'E</td>
</tr>
<tr>
<td>156</td>
<td>579798.56 E</td>
<td>5312741.97 N</td>
<td>42° 20.0091'S</td>
<td>147° 58.1169'E</td>
</tr>
<tr>
<td>157</td>
<td>579788.88 E</td>
<td>5312691.84 N</td>
<td>42° 20.0362'S</td>
<td>147° 58.1103'E</td>
</tr>
<tr>
<td>154</td>
<td>579740.18 E</td>
<td>5312703.52 N</td>
<td>42° 20.0302'S</td>
<td>147° 58.0747'E</td>
</tr>
</tbody>
</table>

Mapping Grid of Australia Zone 55 Coordinates

Zone Area
The area of Sub-Zone 6D is approximately 0.25 hectares.

Maximum Leasable Area
The maximum leasable area within Sub-Zone 6D is 0.25 hectares.

Categories of Fish
The categories of fish permitted for culture within Sub-Zone 6D, subject to the provisions of a marine farming licence, are juvenile shellfish up to 20 millimetres.
Management Controls
The management controls applying to Sub-Zone 6D are stipulated in Section 3 of the Great Oyster Bay and Mercury Passage Marine Farming Development Plan October 1998.

Special Management Control
Marine farming activities within Sub-Zone 6D are restricted to the culture of juvenile shellfish using infrastructure, equipment and techniques commonly associated with FLUPSY’s (Floating Upweller System).
Zone 7 (South Little Swanport)

Location

South Little Swanport zone is located on the western side of Great Oyster Bay in deep water. The zone is approximately 206.7 ha and south of the mouth of the estuary. It is approximately 0.65-0.7 km off-shore (See Map 14).

Environmental Conditions

This zone is in water between 32 m and 37 m deep. There is a sandy bottom. The exposure to easterly weather creates rough conditions with swells breaking on the local shoreline.

Environmental data collected during 1996 indicates a sandy bottom with some large beds of screwshell (Maoricolpus roseus) to the north of the zone. Video drops indicate the remainder of the zone has a fine sandy bottom with sparse vegetation and many screwshells. The area does not receive any freshwater discharge from Little Swanport but is influenced by the Southern Ocean current from the south, which is nutrient rich.

Results of the sediment samples and description of the video footage record are given below, the location of the video drop sites is shown on Map 14.

Sediment Samples:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of sediment type, colour &amp; texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (cnr b)</td>
<td>Relatively fine sand, dark greenish grey. Four small (2-3cm) bivalves (live).</td>
</tr>
</tbody>
</table>

Vertical Video Drops:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of bottom type</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Sand bottom with sparse vegetation cover (occasional small patch “low” weed).</td>
</tr>
<tr>
<td>V2</td>
<td>Sand with numerous spiral shells (Maoricolpus roseus), mostly buried near surface. Very little vegetation.</td>
</tr>
<tr>
<td>V3</td>
<td>Sand, relatively bare with occasional small piece of drift weed.</td>
</tr>
</tbody>
</table>

Existing Use

There are no existing marine farms in the area, but there is interest in the area for the production of shellfish.
Brief History

There has been no marine farming in the area although, as on most of the east coast rocky reefs nearby are used by fishers for rock lobster.

Future Potential

There is potential for an increase in deepwater shellfish farming provided farming techniques can withstand the weather conditions.

This deepwater farming could supplement the intertidal farming in Little Swanport and will be suitable for a range of shellfish species and new growing techniques.

Navigation Channels and Safe Anchorages

The zone is not near any commercial navigation channels.

Marinas, Public Jetties and Other Public Facilities

There are no public facilities on the adjacent land.

Surrounding Land Use

The surrounding land is zoned Rural and marine farming is a permitted use in this zone under the draft Glamorgan Spring Bay Planning Scheme.

Sewage and Stormwater Outlets

There are no stormwater or sewage outlets in the area.

Summary of Zone

The zone has been identified as suitable for the farming of a range of shellfish species, including oysters, mussels, scallops and abalone. The zone size is approximately 206.7 ha with a maximum leasable area of 100 ha. The species to be farmed will be shellfish and seaweed.

Zone 7 consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:
<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>585085.17 E</td>
<td>5312281.40 N</td>
<td>42° 20.2243'S</td>
<td>148° 1.97058'E</td>
</tr>
<tr>
<td>10</td>
<td>585264.67 E</td>
<td>5310717.92 N</td>
<td>42° 21.0679'S</td>
<td>148° 2.11518'E</td>
</tr>
<tr>
<td>11</td>
<td>586503.91 E</td>
<td>5310712.13 N</td>
<td>42° 21.0628'S</td>
<td>148° 3.01788'E</td>
</tr>
<tr>
<td>12</td>
<td>586503.91 E</td>
<td>5312264.04 N</td>
<td>42° 20.2243'S</td>
<td>148° 3.0039'E</td>
</tr>
<tr>
<td>9</td>
<td>585085.17 E</td>
<td>5312281.40 N</td>
<td>42° 20.2243'S</td>
<td>148° 1.97058'E</td>
</tr>
</tbody>
</table>

Mapping Grid of Australia
Zone 55 Coordinates
Zone 9 (North Little Swanport)

Location

North Little Swanport zone is located on the western side of Great Oyster Bay in deep water. The zone covers approximately 244.8 ha and is 1.6 to 2 km from Saltworks Coastal Reserve. The inshore boundary runs parallel to the coast line (See Map 15).

Environmental Conditions

This zone is in water between 18 m and 25 m deep, over a sandy bottom. The exposure to easterly weather creates rough conditions with swells breaking on the local shoreline. The zone will also be influenced by discharges from the Little Swanport estuary.

Video drops indicated a furrowed sandy bottom with large shell debris with seaweeds in the troughs. The bottom indicates exposure to swell.

Detailed results of the sediment samples and a description of the video footage record are given below, with the location of the video drop sites shown on Map 15.

Sediment Samples:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of sediment type, colour &amp; texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Relatively fine sand (olive) with some small fragments of shell grit. One live small brittle star, one large scallop shell valve, several cockle shells (dead) and one Maoricolpus roseus.</td>
</tr>
<tr>
<td>2</td>
<td>Relatively fine sand (olive) with greater amount of shell grit than above. One small bivalve.</td>
</tr>
<tr>
<td>3</td>
<td>Relatively fine sand (olive) with some fine shell grit. Two heart urchins (Echinocardium cordatum), clam/cockle valves (different species), two large mussel valves (Modiolus sp), several mud shrimps, Callianassa sp.</td>
</tr>
</tbody>
</table>

Vertical Video Drops:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of bottom type</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Sand with shell grit, larger fragments of shell and valves present (clams, mussels, spiral shells). Patchy weed cover generally attached to shell debris, some fragments of drift weed. Occasional heart urchin (E. cordatum) case observed.</td>
</tr>
<tr>
<td>V2</td>
<td>Coarse sand/shell grit, dense patches of spiral shells (M. roseus) with occasional macroalgae attached. 10-20% vegetation cover, mostly low weed but occasional taller weed (Phyllospora comosa, Ecklonia radiata). Occasional scallop shell debris, sponges of different varieties. Low undulating bottom with frequent raised burrow holes/mounds. Drifting onto reasonably bare sand with occasional attached weed.</td>
</tr>
<tr>
<td>V4</td>
<td>Relatively bare sand, low rippled. Occasional large fragment of shell. Some pieces of drift weed.</td>
</tr>
</tbody>
</table>
Very sparse patches of thread-like weed, S. lomentaria in appearance.

V5 Reef, rocky bottom, predominantly P. comosa and E. radiata.

V6 Sand with occasional large pieces of shell or dead bivalve shells (still joined at hinge).

**Existing Use**

There are no existing marine farms in the area although there have been permits for deep water experimental work to the south of the zone.

**Brief History**

There have been no marine farms in the area.

**Future Potential**

There is potential for shellfish farming in the deep water provided farming techniques can withstand the occasional bad weather conditions. This deepwater farming will supplement the intertidal farming in Little Swanport. The zone has potential to provide relocation for a lease in unsuitable intertidal water in Lisdillon Lagoon.

The use of minimum surface equipment consistent with farming in such exposed areas will reduce the potential for visual impact affecting people with residences in the area.

**Navigation Channels and Safe Anchorages**

The zone is not near any commercial navigation channels.

**Marinas, Public Jetties and Other Public Facilities**

There is a public launching ramp in the mouth of the estuary, which is used by recreational boaters extensively during the summer period.

**Surrounding Land Use**

The surrounding land is zoned Rural and marine farming is a permitted use in this zone under the draft Glamorgan Spring Bay Planning Scheme.

Some parts of this coastal area are subdivided, with permanent and semi-permanent dwellings.
Sewage and Stormwater Outlets

There are no stormwater or sewage outlets in the area.

Summary of Zone

The zone is seen as suitable for the farming of a range of shellfish species, including oysters, mussels, scallops and abalone. The zone area will be approximately 244.8 ha with a maximum leasable area of 130 ha. The area will supplement the production of oysters in Little Swanport and the species to be farmed will be shellfish and seaweed.

Zone 9 consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>584475.83 E</td>
<td>5318135.39 N</td>
<td>42° 17.0655'S</td>
<td>148° 1.47558'E</td>
</tr>
<tr>
<td>14</td>
<td>583585.81 E</td>
<td>5316649.87 N</td>
<td>42° 17.8739'S</td>
<td>148° 0.84084'E</td>
</tr>
<tr>
<td>15</td>
<td>584988.50 E</td>
<td>5316224.70 N</td>
<td>42° 18.0945'S</td>
<td>148° 1.8654'E</td>
</tr>
<tr>
<td>16</td>
<td>585828.82 E</td>
<td>5317850.47 N</td>
<td>42° 17.2106'S</td>
<td>148° 2.46252'E</td>
</tr>
<tr>
<td>13</td>
<td>584475.83 E</td>
<td>5318135.39 N</td>
<td>42° 17.0655'S</td>
<td>148° 1.47558'E</td>
</tr>
</tbody>
</table>

Mapping Grid of Australia
Zone 55 Coordinates
Zone 10 (Webber Point)

Location

The zone at Webber Point is located south of Swansea, offshore from Webber Point. The zone is approximately 62.4 ha and lies 470 m from the nearest land (See Map 16). The zone may be visible from parts of the coastal road.

Environmental Conditions

The zone will have some shelter from the Freycinet Peninsula and is in water approximately 10 -12 m deep. The sediment is described as sandy and is subject to movement in rough weather conditions.

The zone has a reasonably uniform sand substrate with evidence of exposure to influences of south/south-easterly swells.

Below is a description of the video footage recorded for two locations, as shown on Map 16.

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of bottom type</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Relatively bare sand bottom with numerous burrow holes. Substrate of sand/shell grit. Frequent clumps of drift weed (Zonaria sp) mixed with other species.</td>
</tr>
<tr>
<td>V2</td>
<td>Sand with more shell grit than previous, frequent clumps of drift weed as described above.</td>
</tr>
</tbody>
</table>

Existing Use

There is one existing marine farm in the area and there is an area available for piping in water for an onshore abalone farm on Webber Point. This zone would provide an offshore site for the on growing of the stock produced at the hatchery.

The information on the existing farm is:

Farm No. 122  
Area 1.01 ha  
Granted in 1988  
Duration 10 years  
Species Abalone  
Holder Golden Bay Corporation (Australia) Pty Ltd

Brief History

The site has been used to trial equipment for growing abalone in the sea in enclosed containers.
**Future Potential**

The area may have the potential for shellfish farming, particularly abalone. Given the turbulent nature of the area during storms, marine farming would most likely be subsurface.

**Navigation Channels and Safe Anchorages**

There are no identified navigation channels in the area.

**Marinas, Public Jetties and Other Public Facilities**

There is a small breakwater at Webber Point associated with the inlet pipe for the onshore farm.

South of the point there is the Cressy Beach Coastal Reserve, which has picnic facilities.

**Surrounding Land Use**

The surrounding land is zoned Coastal Rural and marine farming is a discretionary use in this zone under the draft Glamorgan Spring Bay Planning Scheme. The adjacent land is privately held and presently used for an onland abalone farm and hatchery.

**Sewage and Stormwater Outlets**

There are no stormwater or sewage outlets in the area. Effluent from the abalone farm is required to meet standards set by the local council.

**Summary of Zone**

The zone is seen as a potential site for the marine farming of shellfish. The zone is 62.4 ha with a maximum leasable area of 50 ha. The Tasmanian Government has in place an Abalone Audit Plan for the effective management and control of both the wild and farmed abalone industries in Tasmania. The Audit Plan will be implemented through marine farming licence conditions imposed on individual marine farmers depending upon the species being farmed and the method employed. The species to be farmed limited to shellfish and seaweed.
Zone 10 consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>589952.79 E</td>
<td>5331852.50 N</td>
<td>42° 9.61764′S</td>
<td>148° 5.33316′E</td>
</tr>
<tr>
<td>6</td>
<td>589982.83 E</td>
<td>5331182.48 N</td>
<td>42° 9.97944′S</td>
<td>148° 5.36118′E</td>
</tr>
<tr>
<td>7</td>
<td>590862.78 E</td>
<td>5331202.58 N</td>
<td>42° 9.96246′S</td>
<td>148° 6.00006′E</td>
</tr>
<tr>
<td>8</td>
<td>590952.83 E</td>
<td>5331862.49 N</td>
<td>42° 9.60534′S</td>
<td>148° 6.05928′E</td>
</tr>
<tr>
<td>5</td>
<td>589952.79 E</td>
<td>5331852.50 N</td>
<td>42° 9.61764′S</td>
<td>148° 5.33316′E</td>
</tr>
</tbody>
</table>

Mapping Grid of Australia Zone 55 Coordinates
Zone II (Great Swanport)

Location

The zone at Great Swanport includes part of the broad estuary on the lower reaches of the Swan River. It is approximately 15 km east of Swansea and 10 km west of Coles Bay. The waters are part of the Moulting Lagoon Game Reserve, administered by under the National Parks and Wildlife Act 1973. Four existing marine farms are located in this estuary (See Map 17).

The area has international importance as it was one of 38 wetland areas that Australia listed when it signed "The Convention on Wetlands of International Importance, Especially as Waterfowl Habitat", or "Ramsar", in 1971. The area of this site is 4508 ha and under the agreement Australia has obligations to maintain the area for the conservation of wetlands.

The site was set aside as a good representative of a marine estuarine system, supporting large concentrations of breeding swans and providing good feeding grounds for migratory wading birds.

A management plan is presently being drawn up for the Game Reserve. There will be no expansion of marine farming in the estuary but there may be relocation of parts of existing lease areas to areas more suitable for farming.

Environmental Conditions

The zone has a range of different environmental conditions as the waters range from intertidal to deep water, approximately 5 m, in the channels. The substrate is sand to mud with seagrass present. There is a reef around Pelican Rocks. The maximum fetch in this area is less than 2 km, so that wave action is minimal.

The Great Swanport River system is subjected to reduced salinity during periods of extended rainfall. The salinity at Pelican Bay has been recorded as zero for about 10 days, indicating extensive periods of freshwater in the lagoon system. There is negligible bacterial pollution and concentrations of heavy metals are well below legal limits (Shellfish Production and Technology, DPIF files).

Extensive mudflats are exposed during low tide, with clearly defined channels. The substrate in the farming areas is described as ranging from medium firm sand to firm mud with softer mud (up to 150 mm thick) in other areas. Seagrass is present in some of the lease areas.
The area is shallow, and there is a high degree of flushing from tidal action, about 40% exchange at neap (twice/day) and about 80% at spring tides.

Existing Use

There are 4 existing marine farm leases in the area, No's 8, 49, 50 and 51. The information on the existing farms is:

Farm No. 8
- Area: 20.04 ha
- Granted in: 1978
- Duration: 20 years
- Species: Oysters, mussels and clams
- Holder: Johnson M.

Farm No. 49
- Area: 23.316 ha
- Duration: 20 years
- Species: Oysters and clams
- Holder: Cole A.M. & Pickard G.

Farm No. 50
- Area: 24.87 ha
- Granted in: 1978
- Duration: 20 years
- Species: Oysters
- Holder: Melrose D.I.

Farm No. 51
- Area: 17.45 ha
- Granted in: 1982
- Duration: 20 years
- Species: Oysters, mussels and clams
- Holder: Aurora Trust

There are extensive areas of the leases which are not used for production, for a range of reasons. Some of the areas are too shallow for the production of shellfish. The Game Reserve is used for a range of recreational activities including water skiing, general boating and fishing. Bream fishing is particularly popular in the area. Parts of the Game Reserve are used for duck hunting during a restricted season.

Brief History

The Swan River was one of the earliest sites for the farming of Pacific oysters in Tasmania. The area was selected for early growth trials in the 1970s and showed
good growth rates. The earliest farms to be set up in the area were in Pelican Bay in 1978. That farm has been partly developed and is now two operations, Farm No 8 and part of Farm No 49.

Farm No 50

The original application in 1983 was for growing Pacific oysters. The operator investigated the feasibility of importing oyster spat from overseas to meet the local demand for spat during the early days of the oyster industry. The unreliable collection of spat from the Tamar River in due course resulted in the development of hatcheries which now supply the oyster spat to all the industry and to some interstate operators.

The area has was subject to heavy rainfall in June 1988 resulting in high levels of stress in the oysters. The operator requested an area of deep water in Great Swanport or Great Oyster Bay and this area was approved in 1989.

A new shed for the handling of the stock and equipment was completed in 1994 and the operator uses a public jetty and boat ramp.

Further periods of heavy rainfall resulted in a request to grow oysters downstream of the existing operations to relieve stress on oysters. However the site has operated successfully since its integration with a deepwater site.

Marine Farm 8

This area was originally granted to Freycinet Aquaculture in 1978, although there was an earlier application in the area by Mr T. Bailey. An inspection was requested to see if the site was suitable for farming of oysters. The Tasmanian Conservation Trust had some reservations, particularly due to the proximity to recreational areas. Preliminary investigations showed high salinities, which indicated that there was little possibility of oysters settling in the area.

A licence to farm Pacific oysters was granted and spat for the area was collected from the Tamar River.

The lease was transferred to M.S. & A. M. Cole in 1988. Part of the lease was transferred to Mark Johnson in 1991, as Lease 8, and the remainder formed part of Lease 49. The site is trading as Pelican Bay Oysters and is licensed for both varieties of oysters, mussels and clams. However there has been limited development of the site in recent years.
Farm No 51

An application for a marine farm in the vicinity of The Junction and Woolshed Point in the Swan River was made by Mr Watson in 1982. Two leases were approved and a third was rejected on the grounds that it would devalue land adjacent to the lease area.

The lease was approved in 1982 to Mr R. H. Watson, Shellfish Production and Technology, and was granted in 1983.

There was little development of the site and the lease was transferred to Morriss Doyle and Windsor in 1990, who traded as Coles Bay Shellfish Pty Ltd.

A survey showed that the site was 17.5 ha and of this about 10 ha was unusable for present species, although it may be suitable for farming of clams in the future.

The site is used in conjunction with a deepwater site in Great Oyster Bay and the operators use a public jetty at Coles Bay.

Farm No 49

The original lease was granted for 16 ha in 1983, with a variation to the lease area in late 1983. The lease is near Pelican Rocks, which is used occasionally for recreational purposes. The location of the lease allows access from the river to Pelican Rocks.

In 1988 it was estimated that only about 4 ha of the lease, could be developed, out of the 16 ha granted.

The lease was varied in 1991 to include 6.6 ha of water previously part of Marine Farm No 8 and it was transferred to Cole and Pickard.

The total area presently in use is only 5 ha; some of the balance is not suitable for species currently being farmed. This farm operates in conjunction with two deepwater sites in Great Oyster Bay.

The farm is part of a tourist venture offering tours over the intertidal farm and the deep water lease sites. This is a highly successful venture that has had wide coverage in the press.
Future Potential

The area is under the control of the National Parks Act as a Game Reserve and does not have potential for an increase in marine farming. DELM has accepted the presence of the marine farms but sees no possibility of further new farms. It may, however, be satisfied with a relocation of some of the existing farming areas.

It is the planning intention to provide for the relocation of approximately 9 ha of marine farming area in the zone. The area available for relocation has been identified in close consultation with officers from Parks and Wildlife responsible for overseeing the management of the Game Reserve.

There may be an opportunity to remove some further farming areas from within the lagoon by the relocation of some areas to deepwater sites.

Holding racks adjacent to shore facilities are used for holding stock immediately prior to sale or before returning to the farm.

The productivity of the area is limited by the influx of fresh water and operations need access to deep water for finishing and as emergency sites following heavy rain.

Navigation Channels and Safe Anchorages

There are no commercial navigation channels in the area but there are navigation channels for smaller vessels. Existing farms are clear of these channels.

Marinas, Public Jetties and Other Public Facilities

There are several small private jetties and semi-public jetties in the area. There are two launching ramps at Swanwick, one at Meredith Point and Sandbanks.

Surrounding Land Use

The surrounding land is mostly private land with small sections of Crown Reserve and a section under the jurisdiction of National Parks and Wildlife. There are small settlements along the banks at the mouth of the estuary, including Swanwick.

The estuary is separated from the sea by an extensive sand spit formed from deposits of recent calcareous sands and localised areas of clay. The dunes on the spit are susceptible to wind and wave erosion and to salt spray effects (Land Systems of Tasmania Region 6).
Sewage and Stormwater Outlets

The dwellings in the area are serviced by septic tanks.

Summary of Zone

The zone is seen as suitable for the continuation of the existing marine farming activities, but subject to the restrictions imposed by the presence of a Game Reserve. It is the planning intention to provide for the relocation of 9 ha of marine farming area in the zone. The area available for relocation has been identified in close consultation with the officers from Parks and Wildlife responsible for overseeing the management of the Game Reserve. Relocation of any marine farming area will be undertaken by the Board of Advice and Reference. There may be the opportunity for the relocation of part of the marine farming area in the lagoon to a deep water area in Great Oyster Bay. The zone is approximately 590.5 ha and the maximum leasable area is 85.676 ha. The species to be farmed will be restricted to shellfish and seaweed.

Zone 11 consists of all that area to HWM of Great Swanport, upstream of a line drawn from point 3 to point 4 and downstream of a line drawn between point 1 and point 2.

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>595936.52 E</td>
<td>5341298.73N</td>
<td>42° 4.47144'E</td>
<td>148° 9.58518'S</td>
</tr>
<tr>
<td>2</td>
<td>595423.19 E</td>
<td>5341131.72N</td>
<td>42° 4.5654' E</td>
<td>148° 9.21456'S</td>
</tr>
<tr>
<td>3</td>
<td>601053.44 E</td>
<td>5339557.71N</td>
<td>42° 5.37354'E</td>
<td>148° 13.3139'S</td>
</tr>
<tr>
<td>4</td>
<td>601337.01 E</td>
<td>5340378.18N</td>
<td>42° 4.9281' E</td>
<td>148° 13.511'S</td>
</tr>
</tbody>
</table>

Mapping Grid of Australia
Zone 55 Coordinates
Picnic Island

Location

The marine farm at Picnic Island is located in waters adjacent to Picnic Island in Coles Bay, in the north of Great Oyster Bay (See Map 18).

Environmental Conditions

This is a totally marine environment in the shelter of Picnic Island in Coles Bay. Picnic Island is a small granite outcrop 1 km from the beach and the farm is located on the eastern side of the island.

Existing Use

There is 1 existing marine farm lease in the area, No. 124.

The information on the existing farm is:

Farm No. 124

<table>
<thead>
<tr>
<th>Area</th>
<th>1 ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granted in</td>
<td>1989, Renewed 1999</td>
</tr>
<tr>
<td>Duration</td>
<td>20 years</td>
</tr>
<tr>
<td>Species</td>
<td>Oysters, mussels, clams and scallops</td>
</tr>
<tr>
<td>Holder</td>
<td>Cole A.M. &amp; Pickard G.</td>
</tr>
</tbody>
</table>

The site is used for juvenile stock as there is some protection near the island.

Brief History

The lease area was subject to an appeal by shack owners and the local council. The area was finally approved with a range of conditions attached. The site has been used for the production of juvenile oysters in conjunction with an intertidal lease in Great Swanport.

Future Potential

The area is seen as having limited potential for further development due to its proximity to the Freycinet National Park. It has limited potential for continued activity as part of a tourism venture including tours from the Freycinet Lodge.
The lease has the potential to relocate to Zone 12B within the north of Great Oyster Bay. Subject to the provisions of the Marine Farming Planning Act 1995, Marine Farm 124 may be relocated to an area within Marine Farming Zone 12B.

Navigation Channels and Safe Anchorages

There are no major navigation channels in the area and the lease is marked to the satisfaction of the Marine and Safety Tasmania.

Marinas, Public Jetties and Other Public Facilities

There are public jetties and launching ramps in the vicinity of Coles Bay, associated with the public use of this popular recreational area. There is a jetty at Freycinet Lodge in the National Park.

The marine farm is serviced by boat with shore access at a base in the Great Swanport Estuary. There are concerns about the use of the estuary at times when the bar across its mouth moves, and the entrance is unreliable in various weather conditions.

Surrounding Land Use

The land adjacent to the lease is National Park and Coles Bay tourism area.

Sewage and Stormwater Outlets

Sewage and stormwater outlets are sufficiently distant from the marine farm lease to minimise any potential impacts. The nearest outlet would be at least 1 km from the lease area.

Summary

The area has not been identified as suitable for expansion of marine farming and has not been zoned. Subject to the provisions of the Marine Farming Planning Act 1995, Marine Farm 124 may be relocated to an area within Marine Farming Zone 12B, which is one of the large zones in the north of Great Oyster Bay.
Zone 12A & B (North Great Oyster Bay)

Location
The zone is located in Coles Bay in the north of Great Oyster Bay and is divided into two sub-zones. Sub-zone A encompasses an area of 1055 ha and sub-zone B covers 892.4 ha. The sub-zones are separated by approximately 1.3 km (See Maps 16 & 17).

Environmental Conditions
The zone is a totally marine environment in the shelter of Freycinet Peninsula in Coles Bay, and no closer than 2 km from the nearest shoreline. It contains three existing leases.

Farm No 119
The site is a totally marine environment, with a water depth of approximately 14 m. It is situated at least 2 km from the nearest shoreline. The sediment is described as sandy bottom. There is some freshwater influence from the Swan River through Great Swanport and the general current in the area moves in a clockwise direction around the bay, passing through the farm from north to south.

Water temperatures in Great Oyster Bay vary between a maximum of 22.3°C in January to a minimum of 9.7°C in August, with average temperatures between 10.5°C and 18.2°C.

Farm No. 126
This farm is approximately 3 km off shore from Dolphin Sands and Nine Mile Beach, the bottom is described as sandy with water depth of 8 m.

Sub Zone A
This is a large zone with boundaries measuring approximately 2.3 km by 4.5 km. was divided into 500 m quadrats for survey purposes. Sample sites were identified using a GPS system
The northern and eastern boundary were surveyed at intervals of approximately 500 m. No reef was observed along this tract. Depths were 10.5 m along the northern boundary and from 10.5 to 17 m southwards along the eastern boundary.
Vertical video drops, with some drift, were conducted at all sites surveyed with sediment samples collected on occasions. Generally, the substrate was observed to be a low rippled sand with varying amounts of shell debris and attached, or detached, ascidians (cf Pyura stolonifera). On occasions considerable amounts of drift weed, predominantly Codium cf harveyi, Zonaria sp and Plocamium sp, was observed with some sparse patches of attached “low” weed (cf Zonaria sp) and cf Heterozostera tasmanica. Visibility was reduced with much suspended sediment in the water column.
due to swell action during the survey periods. Sediment samples collected contained fine sand with coarse shell grit and valves of shells, mostly cf Tawera sp.

With the knowledge that areas of reef have been reported, particularly along the western boundary region, close observation of the echo sounder was made at all times when traversing the zone. No reef was observed over the regions traversed within the zone. Additionally, an area outside the mid-western region of the zone was surveyed, with no reef found.

Results of the video survey and sediment samples are listed below. Depths for each site are provided also. Location of sample sites is shown on Maps 16 & 17, plotted using the corrected GPS coordinates.

(a) Vertical video drops:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Depth</th>
<th>Description of bottom type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.6 m</td>
<td>Sand substrate, low rippled, very poor visibility, drift weed observed.</td>
</tr>
<tr>
<td>2</td>
<td>10.5 m</td>
<td>Sand substrate, low rippled, some shell debris observed, much drift weed. Very turbid conditions.</td>
</tr>
<tr>
<td>3</td>
<td>11 m</td>
<td>Sand substrate, low rippled, some shell debris observed. Sediment sample collected.</td>
</tr>
<tr>
<td>4</td>
<td>10.5 m</td>
<td>Sand substrate, low rippled with shell debris.</td>
</tr>
<tr>
<td>5</td>
<td>10.6 m</td>
<td>Sand, slightly ridged.</td>
</tr>
<tr>
<td>6</td>
<td>11 m</td>
<td>Sand, low rippled, occasional patches of shell debris and drift weed, poor visibility.</td>
</tr>
<tr>
<td>7</td>
<td>11.4 m</td>
<td>Sand, low rippled/undulating, shell debris and drift weed (Codium cf harveyi; Zonaria sp &amp;/or Plocamium sp) poor visibility. Occasional ascidians (cf Pyura stolonifera) and larger patches of shell debris.</td>
</tr>
<tr>
<td>8</td>
<td>11.7 m</td>
<td>Relatively bare slightly rippled sand, patches of ascidians (cf Pyura stolonifera) and shell debris in troughs, occasional fragments of drift weed.</td>
</tr>
<tr>
<td>9</td>
<td>11.4 m</td>
<td>Sand, low rippled and relatively bare. Occasional large patches of ascidians (cf Pyura stolonifera) (some appear attached others drifting) Spider crab, moderate amount of drift weed (Codium cf harveyi; Zonaria sp &amp;/or Plocamium sp) poor visibility.</td>
</tr>
<tr>
<td>10</td>
<td>11.1 m</td>
<td>Sand, rippled substrate, no attached weed observed.</td>
</tr>
<tr>
<td>11</td>
<td>12.4 m</td>
<td>Sand, low rippled, shell debris, much drift weed; poor visibility.</td>
</tr>
<tr>
<td>12</td>
<td>12.4 m</td>
<td>Relatively bare sand, rippled. Occasional dense patches of shell debris and ascidians (cf Pyura stolonifera) in troughs, some drift weed and occasional unattached ascidian (ie drifting), poor visibility.</td>
</tr>
<tr>
<td>13</td>
<td>12.6 m</td>
<td>Relatively bare sand, low rippled. Moderate density of small burrow holes visible. Shell debris and ascidians (cf Pyura stolonifera) with occasional dense patches of these in troughs. Sparse to dense drift weed, “rolls” of red algae (cf Plocamium sp) very similar in appearance to that which washes up on Swansea beach and Codium cf harveyi. Poor visibility.</td>
</tr>
<tr>
<td>14</td>
<td>12.1 m</td>
<td>Rippled sand, evidence of swell influence. Shell debris of small to large (whole shell valves) and ascidians (cf Pyura stolonifera) in troughs, drift weed (particularly Codium cf harveyi and cf Plocamium sp/Zonaria sp) and detached ascidians(cf Pyura stolonifera). Small burrow holes visible, poor visibility with much suspended sediment in water column.</td>
</tr>
<tr>
<td>15</td>
<td>11.9 m</td>
<td>Slightly rippled sand, some drift weed.</td>
</tr>
<tr>
<td>16</td>
<td>12.3 m</td>
<td>Slightly rippled sand, sparse drift weed, occasional ascidians (cf Pyura stolonifera) and patches of shell debris. Poor visibility.</td>
</tr>
<tr>
<td>Station</td>
<td>Depth (m)</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>17</td>
<td>13.1</td>
<td>Low rippled relatively bare sand, sparse drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>), poor visibility.</td>
</tr>
<tr>
<td>18</td>
<td>13.1</td>
<td>Low rippled relatively bare sand, large patches of drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>) and moderate density of detached ascidians (cf <em>Pyura stolonifera</em>).</td>
</tr>
<tr>
<td>19</td>
<td>12.5</td>
<td>Rippled sand, slightly larger/higher ripples than previous. Dense shell debris and ascidians (cf <em>Pyura stolonifera</em>) in troughs. Moderate amount of drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>), occasional screw shells (<em>Maoricolpus roseus</em>), occasional sponges, sparse cf <em>Heterozostera tasmanica</em>, one <em>Coscinasterias muriacta</em>. Poor visibility.</td>
</tr>
<tr>
<td>20</td>
<td>12.2</td>
<td>Low rippled sand with shell debris.</td>
</tr>
<tr>
<td>21</td>
<td>12.5</td>
<td>Low rippled sand, relatively bare. Some shell debris to occasional dense patches of shell debris. Drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>), and occasional detached ascidians (cf <em>Pyura stolonifera</em>).</td>
</tr>
<tr>
<td>22</td>
<td>13.4</td>
<td>Low rippled sand, relatively bare. Some drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>), sparse shell debris, moderate density of small burrow holes.</td>
</tr>
<tr>
<td>23</td>
<td>13.7</td>
<td>Low rippled sand, relatively bare, some drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>). Occasional attached ascidians (cf <em>Pyura stolonifera</em>) and some shell debris.</td>
</tr>
<tr>
<td>24</td>
<td>13.8</td>
<td>Low rippled sand, relatively bare. Occasional ascidians (cf <em>Pyura stolonifera</em>), mostly detached, some red drift weed (cf <em>Plocamium</em> sp).</td>
</tr>
<tr>
<td>25</td>
<td>13.2</td>
<td>Low rippled sand, relatively bare, dense quantities of drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>).</td>
</tr>
<tr>
<td>26</td>
<td>13.2</td>
<td>Low rippled sand, relatively bare, sparse shell debris, sparse drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>), occasional detached ascidians (cf <em>Pyura stolonifera</em>).</td>
</tr>
<tr>
<td>27</td>
<td>13.9</td>
<td>Low rippled sand, relatively bare, some shell debris, sparse drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp), occasional detached ascidian (cf <em>Pyura stolonifera</em>).</td>
</tr>
<tr>
<td>28</td>
<td>15</td>
<td>Low rippled sand, relatively bare, some shell debris, sparse drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp), occasional detached ascidian (cf <em>Pyura stolonifera</em>) and large fragments of detached <em>Codium</em> cf <em>harveyi</em>.</td>
</tr>
<tr>
<td>29</td>
<td>14.8</td>
<td>Low rippled sand, relatively bare, sparse fine shell debris, sparse drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp), occasional detached ascidian (cf <em>Pyura stolonifera</em>).</td>
</tr>
<tr>
<td>30</td>
<td>15.3</td>
<td>Rippled relatively bare sand, moderate shell debris.</td>
</tr>
<tr>
<td>31</td>
<td>12.3</td>
<td>Relatively bare, low rippled sand, patches of large fragments of shell debris, some drift weed, occasional patches of anchored ascidians (cf <em>Pyura stolonifera</em>). Poor visibility.</td>
</tr>
<tr>
<td>32</td>
<td>13.8</td>
<td>Relatively bare, low rippled sand. Occasional fragments of detached <em>Codium</em> cf <em>harveyi</em> and “rolls” of drift red algae (cf <em>Plocamium</em> sp), occasional detached ascidian (cf <em>Pyura stolonifera</em>).</td>
</tr>
<tr>
<td>33</td>
<td>14.9</td>
<td>Low rippled sand, relatively bare. Sparse drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp) and fragments of detached <em>Codium</em> cf <em>harveyi</em>, some shell debris. Poor visibility.</td>
</tr>
<tr>
<td>34</td>
<td>15.4</td>
<td>Low rippled sand, relatively bare, sparse shell debris, sparse drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>), occasional detached ascidians (cf <em>Pyura stolonifera</em>).</td>
</tr>
<tr>
<td>35</td>
<td>16.1</td>
<td>Rippled sand, shell debris and drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp and fragments of detached <em>Codium</em> cf <em>harveyi</em>). Reduced visibility with much suspended sediment in the water column.</td>
</tr>
<tr>
<td>36</td>
<td>13.4</td>
<td>Low rippled sand, relatively bare, sparse drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>), occasional patches of attached ascidians (cf <em>Pyura stolonifera</em>).</td>
</tr>
<tr>
<td>37</td>
<td>13.8</td>
<td>Low rippled sand, relatively bare, sparse mostly detached ascidians (cf <em>Pyura stolonifera</em>) with occasional dense patches, some drift weed weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>), sparse shell debris.</td>
</tr>
<tr>
<td>38</td>
<td>14.9</td>
<td>Low rippled sand, relatively bare, sparse drift weed (cf <em>Plocamium</em> sp/<em>Zonaria</em> sp &amp; <em>Codium</em> cf <em>harveyi</em>), some shell debris and occasional patches of attached ascidians (cf <em>Pyura stolonifera</em>).</td>
</tr>
</tbody>
</table>
39 15.5 m Low rippled, relatively bare sand, some drift weed (predominantly cf Plocamium sp/Zonaria sp but also Codium cf harveyi), occasional small patches of attached ascidians (cf Pyura stolonifera).

40 16.7 m Relatively bare, low rippled sand, shell debris and drift weed (cf Plocamium sp/Zonaria sp & Codium cf harveyi). Much suspended sediment in water column.

41 13.6 m Relatively bare, low rippled sand, sparse drift weed (cf Plocamium sp/Zonaria sp & Codium cf harveyi), occasional small patches of attached ascidians (cf Pyura stolonifera).

42 13.9 m Relatively bare, low rippled sand. Sparse drift weed (predominantly cf Plocamium sp/Zonaria sp but also Codium cf harveyi), occasional anchored and detached ascidians (cf Pyura stolonifera). Poor visibility with much suspended sediment in water column.

43 15 m Low rippled, relatively bare sand, sparse drift weed with occasional large fragment of detached Codium cf harveyi.

44 16 m Low rippled, relatively bare sand. Drift weed (cf Plocamium sp/Zonaria sp & Codium cf harveyi) with occasional large fragments of Codium cf harveyi.

45 15.8 m Rippled sand with coarse shell debris in troughs, dense drift weed (large fragments of Codium cf harveyi; Caulerpa sp, cf Plocamium sp/Zonaria sp, fine red algae, bryozoans), ? algae attached to shell debris in troughs (cf Zonaria sp). Poor visibility with much suspended sediment in water column.

(b) Sediment samples:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of sediment type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Sand with shell grit and bivalve shells, mostly cf Tawera sp, no algae in sample.</td>
</tr>
<tr>
<td>23</td>
<td>Relatively fine sand with some shell debris, reasonably well compacted. 1 small live bivalve (venerid species) and numerous ghost shrimps (Callianassa sp.). A number of the Callianassa sp shrimps were “berried” with specimens collected and sent to the Victorian Museum.</td>
</tr>
<tr>
<td>42</td>
<td>Fine sand with shell debris (1 small dead ‘mock oyster’ (Electroma georgiana)), reasonably well compacted substrate.</td>
</tr>
</tbody>
</table>

Sub-zone B varies in depth between 9 m and 18 m, with one hole of approximately 22 m identified. The sediments in the area are described as ranging from light tan sand with medium shell of 3-4%, to light fine sands then sands with coarse shell grit and debris. This was covered by frequent patches of squirts and sponges with weed attached. The video transect showed bioturbation with grey coloured sands around the larger holes.

A description of the video transects is given below with site numbers shown on Map 17.

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of bottom type</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Sand bottom with patchy “low” weed cover, clumps of sponges, flathead.</td>
</tr>
<tr>
<td>V2</td>
<td>Sand with coarse shell grit/debris. Frequent, but patchy, squirts/sponges with weed attached. Drift weed (Zonaria sp, Codium sp). Burrow holes with grey coloured sand around the openings of the larger ones. Banded stingaree. Appear to be loose algal “mat” patches over sand in some areas.</td>
</tr>
</tbody>
</table>
Existing Use
There are three existing leases in the area. Information on the existing farms is:

**Farm No. 119**
Area: 45 ha
Granted in: 1988
Duration: 20 years
Species: Oysters, mussels, and scallops
Holder: Aurora Trust

**Farm No. 126**
Area: 20.01 ha
Granted in: 1989
Duration: 20 years
Species: Oysters
Holder: Melrose D. I.

**Farm No. 158**
Area: 5 ha
Granted in: 1996
Duration: 20 years
Species: Oysters
Holder: Cole A. M. & Pickard G.

Brief History
The northern section of Great Oyster Bay has been used for deepwater farming over the past 9 years. During this period techniques to farm the deepwater exposed sites have been developed and continue to be developed. The area has been used for the farming of Pacific oysters, flat oysters and scallops.

Future Potential
The area is seen as having potential to include water for the farming of deepwater shellfish. This area is not highly visible from the National Park or most surrounding view points. It is slightly visible on certain days but the distance offshore makes it suitable for expansion. It is a very large area and there should be adequate room for separation distances.

Navigation Channels and Safe Anchorages
The zone is clear of major navigation channels in the bay and also clear of the channels used by the recreational boat owners. Sub-zone B remains clear of a direct passage from Swanwick to Schouten Island and the separation distance between the sub-zones should allow easy navigation of the area. Areas within a zone that are not occupied by leases will not be marked and will be available for normal activities.

Marinas, Public Jetties and Other Public Facilities
There are public jetties and launching ramps in the vicinity of Coles Bay, associated with the public use of this popular recreational area. A jetty has been built in association with the Freycinet Lodge development in the National Park.
The existing marine farms are serviced by boats with shore access at a base in the Great Swanport Estuary and one operator uses the public jetty and launching ramp in Coles Bay. There are concerns about the use of the estuary at times when the bar across its mouth moves, and the entrance is unreliable in various weather conditions.

**Surrounding Land Use**
The land adjacent to the lease is Freycinet National Park and Coles Bay recreation area on Crown Land. There are sections of private freehold land with a Coastal Reserve along the foreshore.

Facilities for handling and packaging large volumes of shellfish will need to be developed when the area set aside is fully developed. Swansea is seen as a site suitable for the development of such infrastructure with areas in the town boundary zoned for industrial use.

**Sewage and Stormwater Outlets**
Sewage and stormwater outlets are sufficiently distant from the marine farm zones to minimise any potential impacts. The nearest outlet would be at least 2 km from the lease area.

**Summary of Zone**
The zone is seen as having the potential to support an increase in deepwater shellfish farming in the area to supplement the intertidal area in Great Swanport and other areas of the State. Sub-zone A will be 1055 ha and sub-zone B will be 892.4 ha. Sub-zone A will have maximum leasable area of 300 ha and sub-zone B will have a maximum leasable area of 180 ha. The species to be farmed will be shellfish and seaweed. The production of filter feeding shellfish does not require the addition of extra nutrients to the ecosystem.

Zone 12A consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>148</td>
<td>592624.00</td>
<td>5336084.11</td>
<td>42° 7.31268'S</td>
<td>148° 7.23258'E</td>
</tr>
<tr>
<td>149</td>
<td>592310.83</td>
<td>5333429.55</td>
<td>42° 8.74914'S</td>
<td>148° 7.0305'E</td>
</tr>
<tr>
<td>150</td>
<td>592275.07</td>
<td>5331553.95</td>
<td>42° 9.76272'S</td>
<td>148° 7.02234'E</td>
</tr>
<tr>
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</table>
Zone 13 (Mercury Passage)

Location

The zone is located between Maria Island and Spring Bay and includes the special lease area occupied by Tasmanian Scallops Pty Ltd (See Map 19).

Environmental Conditions

The zone is in water between 25 m and 35 m deep. As the zone covers a large area there is a range of bottom types with the dominant sediment being coarse sands ranging through to fine sands with coarse shell grit.

The dominant current direction is from south to north although modelling indicated a wind driven system with local variations depending upon the topography.

Brief History

The area is a part of the original area allocated to Tasmanian Scallops Pty Ltd under an exploratory licence in 1993. In May 1996 this converted to a special lease under the Marine Farming Planning Act 1995 and is part of the area set aside for the husbandry of scallops using bottom reseeding and hanging culture. Large areas of Great Oyster Bay were used by the company for reseeding of scallops, however the project has contracted greatly and now concentrates on the culture of scallops in this smaller area.

Future Potential

The company may undertake the farming of a range of species in the lease area within the zone. Special conditions on the operation of the lease area will allow the passage of vessels through the lease area. Part of the lease area, 100 ha, may be set aside for exclusive occupation and the location of this will be determined in consultation with the Marine and safety Tasmania.

Navigation Channels and Safe Anchorages

The zone has been set in close consultation with the Marine and Safety Tasmania and although close to navigation channels it is sufficiently clear of major navigation channels not to be a hazard to navigation.
It will be necessary to include in the lease conditions relating to navigation issues. The area must allow the passage of vessels having a draught of not more than 5 m passage through the lease area, although not allowing vessels to anchor in the area.

The proposed lease area to be set aside for exclusive occupation, ie no vessels to pass through it, will be set in consultation with the Marine and Safety Tasmania to ensure that its location takes account of navigation channels.

There are no safe anchorages within the zone, particularly given the exposed nature of the area and the depths involved.

Marinas, Public Jetties and Other Public Facilities

There are no marinas or jetties near the zone which is located approximately 2 km from the nearest shoreline. The lease area will be serviced by vessels from Spring Bay as is the present case.

Surrounding Land Use

The land adjacent to the zone around Triabunna is rural with a Coastal Reserve, extending around part of it. Maria Island is managed as a National Park under the Parks and Wildlife Act 1976.

Sewage and Stormwater Outlets

There are no outlets in close proximity to the zone as it is approximately 2 km from the nearest shoreline.

Summary of Zone

The zone has been identified as having the potential to provide for the continued husbandry of scallops and to provide for the farming of other shellfish species using deepwater farming techniques. The zone is 5105 ha and reflects existing occupation of the area by the company. Within the zone there will be a special lease area of 3504 ha for the husbandry of shellfish by reseeding. This is discussed in the section on special leases.

The balance of the zone will be a lease area of 1598 ha, subject to the conditions of a marine farming licence, for hanging culture and bottom reseeding of shellfish. A condition of the lease area will be the requirement for passage through the lease area for vessels, with a draught of less than 5 m. Within the lease area it is proposed
that there may be an area of 100 ha for exclusive occupation, the location of this area will be set in consultation with the Marine and Safety Tasmania.

The zone size is 5105 ha, the maximum leasable area is 5105 ha. It will include a special lease area of 3504 ha, a lease area of 1598 ha and the area for exclusive occupation is 100 ha. The species to be farmed will be shellfish and seaweed.

Zone 13 consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

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Mapping Grid of Australia
Zone 55 Coordinates

The lease consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

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Mapping Grid of Australia
Zone 55 Coordinates
Zone 14 Special Lease 1 (Stapleton Point)

Location

Stapleton Point is located on the coast approximately 5 km south of Orford, south of Stapleton Beach it forms a small bay called South East Corner (See Map 20). The point is not readily accessible by road. The zone will be a special lease area in which all activities normally taking place by the public will continue, except for the harvesting of sea urchins. The zone will extend for approximately 150 m from the low tide mark seaward including the bay and around the point.

Environmental Conditions

The zone covers some areas of hard bottom with dolerite boulders on reef areas. The depth of the area varies up to approximately 15 m. There are seaweeds extending from 2m to the 15 m mark on the inside of the point in South East Corner. The seaweeds extend from 2 m to 6 - 8 m on the outside of the point. There is an extension of the reef on the outside of the point to well off-shore. The main species of seaweed found are Phyllospora comosa and Ecklonia radiata.

Existing Use

There are no existing marine farms in the area. The area has been fished commercially for rock lobster, abalone and sea urchins in the past and is still used for recreational and commercial netting. None of these activities, for the general public, apart from the harvesting of sea urchins, would be restricted by the zoning of the area as a special lease area.

Brief History

There has been no marine farming in the area.

Future Potential

The zone has potential as a special lease area for the management of sea urchin populations.

Navigation Channels and Safe Anchorages

The zone is not in any navigation channels and there are no safe anchorages recognised in the area. As the area is to be used as a special lease there will be no
surface marking of the area and navigation and anchoring in the area will not be restricted.

*Marinas, Public Jetties and Other Public Facilities*

There are no public facilities in the area and the area is inaccessible to the general public except by boat from Stapleton Beach.

*Surrounding Land Use*

The surrounding land is zoned Rural and marine farming is a permitted use in this zone under the draft Glamorgan Spring Bay Planning Scheme.

*Sewage and Stormwater Outlets*

There are no stormwater or sewage outlets in the area.

*Summary of Zone*

The zone has been identified as a special lease area for the manipulation of sea urchin populations. The zone area is approximately 10.74 ha, with a maximum leasable area of 10.69 ha, extending approximately 150m from the low water mark.

Zone 14, Special Lease 1, consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

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Mapping Grid of Australia
Zone 55 Coordinates
Zone 15 Special Lease 2 (Meredith Point)

Location

Meredith Point is located on the northern shore of Prosser Bay, at the mouth of Spring Bay. The point is not readily accessible by road (See Map 10). The zone will be a special lease area in which the general public may continue to undertake normal activities, except for the harvesting of sea urchins.

The zone will extend for approximately 500 m from the low tide mark seaward, into Prosser Bay.

Environmental Conditions

The zone covers some areas of hard bottom, with dolerite boulders on reef areas, and sandy areas in the eastern end of the zone. A reef area extends from Meredith Point through to Luther Point. The water depth varies up to approximately 15m. The main species of seaweed found are Caulocystis sp., Sargussum sp., a little Ecklonia radiata and Caulerpa sp.

Existing Use

There are no existing marine farms in the area. The area was used in an experiment for sea urchin research in the past.

Brief History

There has been no marine farming in the area.

Future Potential

The zone has potential as a special lease area for the management of sea urchin populations.

Navigation Channels and Safe Anchorages

The zone is not in any navigation channels and there are no safe anchorages recognised in the area. As the area is to be used as a special lease there will be no surface marking of the area and navigation and anchoring in the area will not be restricted.
Marinas, Public Jetties and Other Public Facilities

There are public launching ramps in Orford, and the Maria Island Ferry Terminal around the point at Louisville.

Surrounding Land Use

The surrounding land is zoned Rural and marine farming is a permitted use in this zone under the draft Glamorgan Spring Bay Planning Scheme.

Sewage and Stormwater Outlets

There are no stormwater or sewage outlets in the area.

Summary of Zone

The zone has been identified as a special lease area for the manipulation of sea urchin populations. The zone area is approximately 60.29 ha, with a leasable area of 60.29 ha, extending approximately 500 m from the low water mark.

Zone 15, Special Lease 2, consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

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Mapping Grid of Australia
Zone 55 Coordinates
Zone 16 Special Lease 3 (Lords Bluff)

Location

Lords Bluff forms the northern boundary of Okehampton Bay (See Map 11). The area is not readily accessible by road. The zone will be a special lease area in which the public may undertake all normal activities, except for the harvesting of sea urchins. The zone will extend for approximately 300m from the low tide mark seaward along the coastline of Okehampton Bay.

Environmental Conditions

The zone covers some areas of hard bottom and sand. The depth of the area varies up to approximately 10 to 15m. There are seaweeds extending from 2m to 15m in depth. The main species of seaweed found in the more sheltered areas from the point outwards and in towards the bay are Phyllospora comosa and Ecklonia radiata. Other species found in the area include Sargussum sp. There are barren rock areas that have been cleared of vegetation (probably by sea urchins), which are known as urchin barrens. The quality of urchin in these areas does not meet the level required by the market.

Existing Use

There are no existing marine farms in the area.

The area has been fished commercially for rock lobster, abalone and sea urchins in the past and is still used for recreational and commercial netting. None of these activities, apart from the harvesting of sea urchins, would be restricted by the zoning of the area as a special lease area.

Brief History

There has been no marine farming in the area.

Future Potential

The zone has potential as a special lease area for the management of sea urchin populations.
**Navigation Channels and Safe Anchorages**

The zone is not in any navigation channels and there are no safe anchorages recognised in the area. As the area is to be used as a special lease there will be no surface marking of the area and navigation and anchoring in the area will not be restricted.

**Marinas, Public Jetties and Other Public Facilities**

There are no public facilities in the area and the area is inaccessible to the general public except by boat from Okehampton Beach.

**Surrounding Land Use**

The surrounding land is zoned Rural and marine farming is a permitted use in this zone under the draft Glamorgan Spring Bay Planning Scheme.

**Sewage and Stormwater Outlets**

There are no stormwater or sewage outlets in the area.

**Summary of Zone**

The zone has been identified as a special lease area for the manipulation of sea urchin populations. The zone area is approximately 33 ha, extending approximately 300 m from the low water mark, with a leasable area of 33 ha.

Zone 16, Special Lease 3, consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:

<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>58</td>
<td>580606.60 E</td>
<td>5292199.29 N</td>
<td>42° 31.1029'S</td>
<td>147° 58.8782'E</td>
</tr>
<tr>
<td>59</td>
<td>580887.60 E</td>
<td>5292218.30 N</td>
<td>42° 31.0909'S</td>
<td>147° 59.0833'E</td>
</tr>
<tr>
<td>60</td>
<td>580929.59 E</td>
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<tr>
<td>61</td>
<td>581053.59 E</td>
<td>5291823.30 N</td>
<td>42° 31.3033'S</td>
<td>147° 59.2078'E</td>
</tr>
<tr>
<td>62</td>
<td>581173.58 E</td>
<td>5291427.29 N</td>
<td>42° 31.5164'S</td>
<td>147° 59.2988'E</td>
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<tr>
<td>63</td>
<td>581311.58 E</td>
<td>5291429.30 N</td>
<td>42° 31.5145'S</td>
<td>147° 59.3996'E</td>
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<tr>
<td>64</td>
<td>581229.57 E</td>
<td>5291008.28 N</td>
<td>42° 31.7425'S</td>
<td>147° 59.3433'E</td>
</tr>
<tr>
<td>65</td>
<td>580691.77 E</td>
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<td>42° 31.3687'S</td>
<td>147° 58.9445'E</td>
</tr>
<tr>
<td>58</td>
<td>580606.60 E</td>
<td>5292199.29 N</td>
<td>42° 31.1029'S</td>
<td>147° 58.8782'E</td>
</tr>
</tbody>
</table>

Mapping Grid of Australia
Zone 55 Coordinates
Zone 17 Special Lease 4 (Christmas Island)

Location

The Christmas Island zone, is located south of Swansea off shore from Christmas Island Point (See Map 21). It is a special lease area for sea urchins and is approximately 100 m from the nearest shoreline.

Environmental Conditions

The zone will have no shelter from the Freycinet Peninsula and is in water approximately 10-12 m deep. The sediment is described as broken dolerite reef with sharp protrusions approximately 60-70 cm high. Between these ridges there are heavy grit sand gutters. The main sea weed species present include Phyllospora comosa and Caulerpa sp., there were once kelp beds in the area.

An area to the east of the proposed zone was initially investigated and the results of this investigation are outlined below. The survey indicated that the zone was over bottom not suitable for the husbandry of sea urchins and further investigations were undertaken.

Results of the sediment samples and description of the video footage record are given below; sample sites and video drop locations are shown on Map 21.

Sediment samples:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of sediment type, colour &amp; texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (cnr c)</td>
<td>Relatively fine sand (light olive brown in colour) with some fine shell grit. Several small gastropods. Poor sample, but conditions made it difficult to take successful grabs.</td>
</tr>
<tr>
<td>2 (cnr d)</td>
<td>Relatively fine sand, occasional small quartz, fine to coarse shell grit/debris. Light olive brown in colour. Small fragment of dark purple sponge, several clam valves.</td>
</tr>
</tbody>
</table>

Vertical Video Drop:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description of bottom type</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Relatively bare sand bottom with occasional “low” weed patch and larger pieces of shell (ie, valves).</td>
</tr>
<tr>
<td>V2</td>
<td>Sand, sparse weed with occasional small clump. Occasional sponge and larger fragments of shell.</td>
</tr>
<tr>
<td>V3</td>
<td>Sand, low undulating. Occasional clump of attached “low” weed, some drift weed (eg, Ecklonia). Much fine branched filamentous weed, some attached others drifting.</td>
</tr>
<tr>
<td>V4</td>
<td>Sand, low undulating. Occasional piece of drift weed and clam-like valves.</td>
</tr>
<tr>
<td>V5</td>
<td>Sand with some shell grit/debris. Low undulating/ridged bottom. Occasional clump of drift weed.</td>
</tr>
</tbody>
</table>
Existing Use

There are no existing marine farms in the area. The area has been used for the commercial harvesting of sea urchins, although no urchin barrens were found in the survey.

Brief History

There is no history of marine farming at this site.

Future Potential

The area has been identified as having potential for the ranching of sea urchins and the manipulation of the populations.

Navigation Channels and Safe Anchorages

There are no navigation channels noted in the area.

Marinas, Public Jetties and Other Public Facilities

There are no public jetties, marinas or other public facilities on land adjacent to the zone.

Surrounding Land Use

The surrounding land is zoned Rural and marine farming is a permitted use in this zone under the draft Glamorgan Spring Bay Planning Scheme. The adjacent land is privately owned.

Sewage and Stormwater Outlets

There are no stormwater or sewage outlets in the area.

Summary of Zone

The zone is seen as a potential site for a special lease for the manipulation of sea urchin populations. The zone is approximately 30.93 ha and 100 m from Christmas Island, with a leasable area of approximately 31 ha.

Zone 17, Special Lease 4, consists of all that area bounded by a line being from points defined by Mapping Grid of Australia Zone 55 (MGA) coordinates:
<table>
<thead>
<tr>
<th>ID</th>
<th>Easting</th>
<th>Northing</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>584808.70 E</td>
<td>5322099.50 N</td>
<td>42° 14.9216'S</td>
<td>148° 1.68294'E thence to</td>
</tr>
<tr>
<td>55</td>
<td>584834.71 E</td>
<td>5321156.47 N</td>
<td>42° 15.4309'S</td>
<td>148° 1.71012'E thence to</td>
</tr>
<tr>
<td>56</td>
<td>585157.70 E</td>
<td>5321164.55 N</td>
<td>42° 15.4244'S</td>
<td>148° 1.94496'E thence to</td>
</tr>
<tr>
<td>57</td>
<td>585142.69 E</td>
<td>5322105.58 N</td>
<td>42° 14.9161'S</td>
<td>148° 1.92576'E thence to</td>
</tr>
<tr>
<td>54</td>
<td>584808.70 E</td>
<td>5322099.50 N</td>
<td>42° 14.9216'S</td>
<td>148° 1.68294'E</td>
</tr>
</tbody>
</table>

Mapping Grid of Australia

Zone 55 Coordinates
Management Controls

Appropriate measures are also required to satisfactorily manage and mitigate 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

Finfish

There must be no unacceptable environmental impact 35 m outside the boundary of the marine farming lease area. Relevant environmental parameters must be monitored in the lease area, 35 m from the boundary of the marine farm lease area and at any control site(s) in accordance with the requirements specified in the relevant marine farming licence.

Shellfish

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.

1.1 Environmental Controls Relating to Carrying Capacity

Shellfish

(i) In all new lease areas used for the intertidal farming of oysters there must not be more than 1 km of stocked racking per hectare of lease area. When racking is next replaced in all existing lease areas used for the intertidal farming of oysters there must not be more than 1 km of stocked racking per hectare of lease area.

(ii) Containers of oysters in intertidal lease areas must be clear of the seabed and there shall be no layering of containers on the racking.

(iii) 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. 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.

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

Finfish

(i) The maximum stocking density of salmonid fish is 25 kg/m3.

(ii) Lessees must ensure that farmed areas are fallowed as soon as practicable after bubbles of hydrogen sulphide and methane gases form in the sediment and rise to the surface.
(iii) Salmonid finfish nets must be at least 1 m clear of the seabed at low tide under normal growing conditions.

1.2 Environmental Controls Relating to Monitoring

Shellfish

(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, being farmed, 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.

(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 of 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).

Finfish

(i) Lessees for finfish farms must comply with the Environmental Monitoring Program for finfish as specified in the relevant marine farming licence. Lessees must provide the following information on an annual basis to the Marine Resources Division (DPIWE):

   a) Total quantity of fish feed used on each lease area per year.
(b) A list specifying the quantities of therapeutic treatments, pesticides, anaesthetics, antibiotics, hormones, pigments, antifoulants, disinfectants, cleansers and any other potentially harmful materials which may have been released in each lease area to the marine environment.

c) Location and size of stocked cages on each lease area and areas being fallowed.

(ii) Environmental data are to be collected and analysed to specified standards at each finfish lease area by persons approved and authorised by the Marine Resources Division (DPIWE). The monitoring requirements for collection, reporting and analysis are detailed in the relevant marine farming licence.

(iii) The lessees of all lease areas are required to ensure that an annual underwater survey to assess the extent of marine farming-derived organic sedimentation and the degree of impact on the benthic community is conducted as 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 lease areas, a baseline survey is required before the marine farming operations commence. Data to be collected may include but is not limited to sediment particle size analysis, organic carbon content of the sediment, redox potentials, water flow rates, current flows and composition of the benthic community. Assessment of baseline environmental data will be used to determine future management and monitoring requirements of the lease area.

(v) For all new lease areas being established, and for all expansions greater than 10% to existing marine farming lease areas 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.

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

1.4 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.

1.5 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.

1.6 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, 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.

(ii) 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.

(iii) Posts on each section of racking on intertidal lease areas must be trimmed to be of consistent height.

(iv) Row markers on intertidal lease areas are to be trimmed to be of consistent height.

(v) 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).

(vi) Floating storage huts, grading facilities and shelters must not be located within a lease area unless authorised under the relevant marine farming licence.

(vii) 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.

(viii) 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.

(ix) 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.

(x) 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.
1.7 **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 Act 1976*.

(ii) Lessees must identify the lease area in a manner specified by the Secretary (DPIWE).

1.8 **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 Department of Primary Industries, 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 of 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.
References


Anon, 1993. Weekend Review.


Coleman N September 1996 - Potential for the establishment of wild populations and biological risk assessment of the introduction of Pacific oysters into Victoria.


Department of Primary Industry and Fisheries 1996 Final Report to the Fisheries Research and Development Corporation, Predictive Modelling of Carrying Capacity of Oyster (Crassostrea gigas) Farming Areas in Tasmania, Tasmanian Govt Printers, Hobart.


Harris G P, Griffiths F B, Clementson L A, Lyne V and Van der Doe H 1999 Seasonal and interannual variability in physical processes, nutrient cycling and the


Oysters and Tasmania by C E Sumner.


Glossary

anoxic  Limited supply of oxygen in the sediments
DELM  Department of Environment and Land Management
DPIF  Department of Primary Industry and Fisheries
GPS  Global Positioning Systems
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
TSQAP  Tasmanian Shellfish Quality Assurance Program

Species Glossary

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

Surveys
The surveys of the marine farm leases are held at the Central Plan Registry at the Office of the Surveyor General, in Hobart.