

**Application for Declaration as an Approved Wildlife
Trade Operation under the *Environment Protection and
Biodiversity Conservation Act 1999***

**Export of Native Oysters (*Ostrea angasi*)
from Tasmanian waters**



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DEPARTMENT of
PRIMARY INDUSTRIES,
WATER and ENVIRONMENT

Tasmania

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EXECUTIVE SUMMARY

The extraction of native oysters from Tasmanian State waters is assessed against the Commonwealth *Guidelines for the Ecologically Sustainable Management of Fisheries* as required by the *Environment Protection and Biodiversity Conservation Act 1999*.

Historically, native oysters were dredged around Tasmania in large quantities and the fishery was in decline by the early 1900's. The fishery has existed sporadically and at a low level for the last 15 years in the sub tidal depths of Georges Bay in the north east of the state. Presently, two divers harvest between 2000 – 4000 dozen oysters each year by hand.

The fishery is classified as developing and management is by issue of a permit under the *Living Marine Resources Management Act 1995*. Controls imposed on the fishery are precautionary in nature and executed by permit condition. The long term viability of the fishery is still being assessed, based on catch data, survey and research results and marketing information gathered from fishers and processors.

The fishery's low impact harvest method results in the minimum of impact occurring on oyster habitat, Georges Bay and its wider ecosystem generally. The level of bycatch occurring in the fishery is considered insignificant.

The following sections of this assessment report are presented to address the Commonwealth *Guidelines for the Ecologically Sustainable Management of Fisheries* produced by Environment Australia. The headings, principles and objectives are presented using the same numbering as the guidelines.

A INTRODUCTION

A.1 History of the fishery

The native ‘flat’ oyster (*Ostrea angasi*) is native to Tasmania and other southern parts of Australia and occurs naturally throughout many Tasmanian waterways. It is closely related to the European ‘Belon’ oyster (*Ostrea edulis*) which attracts a premium price from gourmets and connoisseurs.

During the late 19th century, beds of native oysters were extensively dredged in the south and south east of Tasmania. Some 22.5 million oysters were dredged annually from State waters in the decade 1860-1870 and by the early 1900s the fishery was declining rapidly. The report of the Royal Commission on Fisheries of Tasmania in 1883 blamed the deterioration of the beds on overfishing and the destruction of the bottom surface. Stocks have never returned to the levels seen during this time, but occur around the state in smaller beds, notably up the east coast and in the D’Entrecasteaux Channel area.

Numerous attempts have been made to cultivate native oysters but research into their aquaculture has been largely unsuccessful in overcoming the slow growth rates that are typical of this species. The culturing of native oysters has not been practised seriously since the Pacific oyster was introduced in the 1950s.

The largest documented surviving native oyster bed is located in Georges Bay in the north east of the State. This population has been the subject of several sustainable harvesting regimes during the past 10 – 15 years. The Flat Oyster Culture Program (FOCP) conducted by the Department in 1991 aimed to sustainably exploit these stocks by the transfer of limited numbers of juvenile oysters to be ongrown on marine farms. However, the oyster disease *bonamiosis* was discovered in the Georges Bay population shortly after the commencement of the FOCP trials which brought the program to a premature end in early 1994.

Since this time, a variety of management mechanisms have been utilised to authorise limited wild harvests of the Georges Bay native oysters stocks, including one-off harvests under exploratory permit in 1992, 1994 and again, by tender in 1997. The sale of the oysters did not

meet the marketing expectations of some of the successful tenderers, resulting in less than expected quantities being harvested and the tender process being extended out to finish in April 2000.

In August 2000, adopting a conservative approach to the quantities recommended for harvest from the available resource, the Minister approved a policy direction whereby the number of exploratory fishing permits was limited to the small number of past participants in recent oyster fisheries. Two permit holders have continued their involvement in the fishery since this time, taking oysters in low numbers particularly in the months from July to November, when the oysters are in good condition and at a time which corresponds with a downturn in other dive fisheries. The fishery is still developing and options for longer term management are being explored, based on catch data, survey and marketing information being gathered from short term permit holders and processors.

Stock assessments in Georges Bay were undertaken in the late 1980s, during the FOCP, prior to the limited wild harvest in 1994, and most recently, in April 2003 on the three main beds currently being harvested. It is intended that, in the future, oyster beds identified in Attachment 1 will be re-surveyed every second year. Formal management triggers are not yet in place due to the scale of the fishery, but resurveys of fished areas may be necessary if significant changes, such as to the size structure of the fishery, are noticed. Specific one-off surveys of new areas may also be conducted.

Intermittent research has been conducted on this species during the past 15 years. Confirmation that the Tasmanian oyster is a different species to the New Zealand flat oyster (*O. lutaria*) resulted from Dix's work (Dix, Trevor G, 1976) in 1976. An in-situ study of flat oyster growth rates was conducted in Georges Bay in 1994-95 (Mitchell et al, 1997), providing data on length and whole weight increases of three size groups of flat oysters over a 12 month period. This study also provided information on larval growth and basic biology of the oyster. Distribution and population sizes in Georges Bay were recorded in 1991 (Wilson, 1991).

A.2 Context of current management regime

The permits which allow the taking and possession of native oysters are issued under Section 14 of the *Living Marine Resources Management Act 1995*. Permits can be issued for specific purposes, in this case, for the development of fisheries, and are issued by the Minister or his delegate subject to certain conditions, for not longer than a 12 month period.

The Act sets out the objectives for the sustainable management of living marine resources in Tasmania and provides the framework for developing and implementing management arrangements for each of the State's fisheries. The objectives of the legislation are provided in Section 7 and Schedule 1 of the Act and are consistent with the objectives of the resource management planning system of Tasmania.

- 7(1) *The purpose of this Act is to achieve sustainable development of living marine resources having regard to the need to -*
- (a) increase the community's understanding of the integrity of the ecosystem upon which fisheries depend; and*
 - (b) provide and maintain sustainability of living marine resources; and*
 - (ba) take account of a corresponding law; and*
 - (c) take account of the community's needs in respect of living marine resources; and*
 - (d) take account of the community's interests in living marine resources.*
- 7(2) *A person must perform any function or exercise any power under this Act in a manner which furthers the objective of resource management.*

SCHEDULE 1 - OBJECTIVES OF THE RESOURCE MANAGEMENT AND PLANNING SYSTEM OF TASMANIA

1. *The objectives of the resource management and planning system of Tasmania are -*
- (a) to promote the sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity; and*
 - (b) to provide for the fair, orderly and sustainable use and development of air, land and water; and*
 - (c) to encourage public involvement in resource management and planning; and*

- (d) to facilitate economic development in accordance with the objectives set out in paragraphs a, b and (c); and*
 - (e) to promote the sharing of responsibility for resource management and planning between the different spheres of Government, the community and industry in the State.*
2. *In clause 1a, "sustainable development" means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety while -*
- (a) sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; and*
 - (b) safeguarding the life-supporting capacity of air, water, soil and ecosystems; and*
 - (c) avoiding, remedying or mitigating any adverse effects of activities on the environment.*

A.3 Description of current management regime

Permits are issued to two fishers on a three monthly basis to allow the taking of 1200 dozen native oysters per fisher from the State waters of Georges Bay classified by the Tasmanian Shellfish Quality Assurance Program (TSQAP) as approved waters for shellfish harvesting. After participants in past fisheries were asked to express interest in 2000, it is current Ministerial policy that no other permits will be issued for Georges Bay. At present, no other permits have been issued allowing oysters to be harvested in other areas of the State. Permit holders are required to abide by all conditions and restrictions imposed by the Director of Environmental and Public Health in relation to the taking and sale of native oysters and maintain a registered and approved depuration site where shellfish are purged.

Fishers must hold a fishing licence (commercial dive) and a fishing licence (personal) to harvest oysters, must do so by non-mechanical means and must not take any other marine shellfish species at the same time. A minimum size limit of 70 mm has been imposed. Where oysters are attached in clumps, the permit holder is required to remove or cause to be removed at the harvest area, all oysters with a shell length less than 70 mm and return these to the water. Permit holders must assist in the husbandry of the native oyster resource in distributing culch and relocating juvenile oysters during the permit period. Historically, this

has been a permit condition to assist oyster population growth in Georges Bay. They must maintain records on the husbandry and record information on the areas of relocation and quantities of oysters relocated.

A.3.1 Availability of documented management arrangements

Permits are publicly available documents as is generally the practice for release of details of access and licensing arrangements for community owned natural resources such as wild fisheries. Information and copies of the permits can be obtained from the fishery manager, the Marine Resources Division of the Department of Primary Industry and Fisheries on 6233 2044. The *Living Marine Resources Management Act 1995* can be viewed at www.thelaw.tas.gov.au.

A.3.2 Consultative process for developing management regime

The Act describes the consultative process which must be undertaken if the Minister intends issuing a permit for the development of fisheries. Prior to issuing a permit for native oysters for this purpose, the Act requires that the Minister must consult with the relevant fishing body. Extensive consultation has been undertaken with the appointed fishing body, in this case the Tasmanian Fishing Industry Council (TFIC) and the Tasmanian Aquaculture Council (TAC) prior to any significant wild harvest commencing, such as those open fisheries which occurred in 1994 and 1997 and the continued permit fishery. Management arrangements for the fishery, including the objectives, are largely developed by the fishery manager in consultation with industry participants, namely divers and processors. In particular, any changes to permit conditions are discussed with the fishers prior to implementation. This consultative pattern has occurred throughout the recent history of the fishery.

A.3.3 Expertise and community involvement in management of the fishery

Tasmanian Aquaculture and Fisheries Institute (TAFI) scientists provide strategic research assessment advice and consult with the fishery manager on oyster survey design and population assessment and dynamics. The Marine Police are consulted about reporting and enforcement provisions of the permits.

Management of the oyster resource in Georges Bay is the responsibility of the Marine Resources Group of DPIWE in consultation with local community representatives where appropriate, including other shellfish harvesters, processors, recreational fisheries managers, and other non-extractive users of Georges Bay.

A.3.4 Objectives of the management regime

As the native oyster fishery is still classified as a developing fishery, the Minister, where appropriate, takes account of the precautionary principle during the development of this fishery. Restricting initial access in the early stages of development is particularly important until sufficient biological information is available. This approach is intended to avert any possibility that pressure to over-exploit the fishery could lead to overfishing or habitat degradation.

Policy objectives and management strategies for the native oyster resource

Below are the objectives of fisheries management for the native oyster fishery and strategies to attain these objectives. The objectives are complementary to the stated resource management and planning objectives described in Schedule 1 of the *Living Marine Resources Management Act 1995*.

1. Maintaining fish biomass and recruitment

- Limiting number of participants in fishery by restricting permit issue.
- Limit total native oyster catch by permit condition.
- Restrict fishing methods and gear to be used in native oyster harvest.
- Monitor performance of native oyster fishery, primarily through catch, in sufficient detail to recommend alteration to management methods if necessary.
- Protect juvenile oysters by imposition of size limit.

2. *Managing environmental interactions*

- Minimise any environmental impact of oyster fishing methods by specifying non-mechanical fishing methods, particularly in areas of ecological significance.
- Minimise bycatch of juvenile oysters and non-target species.
- Manage marine environmental concerns such as the introduction and translocation of disease in accordance with the relevant Departmental policies.

3. *Sustaining yield and reducing incidental fishing mortality*

- Sustaining yield by taking oysters at a size likely to optimise the yield from fish being recruited to the fishery.
- To provide management measures including non-mechanical fishing methods and imposition of a size limit, to minimise incidental fishing mortality as a result of oyster harvest operations.

4. *Access to native oyster resources by non-commercial and non-extractive users*

- Maintain and provide reasonable access to oyster beds for recreational users.
- Limit the development of oyster fisheries in areas of State waters that are of particular significance to recreational users.
- Minimise adverse interaction between commercial native oyster fishers and other users of the marine environment, including non-extractive users.

5. *Enforcement and monitoring*

- To prevent persons taking native oysters in excess of commercial or recreational catch limits under the *Living Marine Resources Management Act 1995*.
- To prevent any breach of native oyster permit conditions by permit holders.
- To monitor the harvest of native oyster monthly to restrict or adjust management controls where necessary.

6. *Cost recovery and socio-economic return to the community*

- To equitably recover an economic return from permit holders to contribute to the costs of management, compliance and research for the native oyster fishery, sufficient to achieve cost recovery over time.
- To provide employment and business opportunities in coastal communities.

7. *Marketing/processing sector*

- To achieve handling and processing practices which ensure the highest quality native oyster product.

A.3.5 Controls on level of harvest in the fishery

Management controls in this developing fishery are controlled by permit condition. At present, permits are only issued for three month periods with a fixed catch allocation, allowing for frequent review of the conditions. The Minister has the power to vary any condition of a permit by notice in writing served on the person who holds the permit. This allows for the swift introduction or alteration of management controls such as catch levels, size limits and area restrictions which is essential due to the exploratory nature of the fishery. The Minister can also revoke a permit by notice in writing to the permit holder.

Powers relating to restrictions on sale of fish for health or human consumption reasons are held by the Director of Public and Environmental Health.

There is a recreational bag and possession limit for *Ostrea angasi* of 50 oysters per person per day.

A.3.6 Enforcement of management arrangements

Tasmania Police Marine and Rescue Division are responsible for enforcing management arrangements. This includes the requirement that fishers must adhere to the 70 mm minimum

size limit, carry a copy of the permit with them when harvesting, land oysters at a designated depuration site and count oysters accurately within 15 minutes of landing. Approved logbooks must be completed prior to any oysters being removed from the point of landing for processing. The completed daily native oyster fishery logbook must be forwarded to the fishery manager within 24 hours of landing. Processors must label all packaging containing native oysters taken under permit and accurately record in a processors logbook the number of oysters taken, the number processed and rejected, the date, average size, consignment number and average sale price. Completed diver and processor logbooks are to be forwarded to the Department within one month of the expiry of the permit.

Compliance checks are carried out by Tasmanian Marine police officers based in St Helens as required including during fishing, at the depuration site and the processing facility. To date, there have not been any recorded offences within the fishery.

A.3.7 Provision for periodic review of the fishery

Permits under the *Living Marine Resources Management Act 1995* for the development of fisheries can not be issued for a period longer than 12 months. Current permits have a duration of three months.

A review of the developmental fishery for native oysters are conducted upon the expiry of each permit and an extensive appraisal is undertaken annually. These include examination of the stock levels, impact on fish stocks or the environment, a review of management, research or compliance costs, market infiltration and success and, if necessary, additional consultation with other users of the resource. An overall evaluation of whether the fishery is likely to be commercially viable and suitable for further development is also appropriate at this stage.

The most recent review, undertaken after the April 2003 survey and after the expiry of the most recent three month permit in May 2003 included revision of catch levels, follow up with the processing sector and review of available market and pricing information. Currently, it appears the fishery may have the potential to move beyond developmental status to commercial but this is subject to further evaluation. The main factor limiting harvest is the market demand for native oysters which has the potential to expand if harvest levels increase.

A.3.8 Assessment of any adverse impacts of the fishery on marine ecosystem

The size of the fishery is such that any adverse impact of the fishery on the marine ecosystem is minimal.

A3.9 Compliance with abatement and recovery plans and bycatch action strategies

Abatement and recovery measures appropriate to the scale of this developing fishery are in place. Bycatch for this fishery, due to its scale and the method of fishing, is negligible.

B ESD ASSESSMENT

B.1 PRINCIPLE 1.

A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover.

B.1.1 Objective 1.

The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability.

B.1.1.1 Information requirements

1.1.1 There is a reliable information collection system in place appropriate to the scale of the fishery. The level of data collection should be based upon an appropriate mix of fishery independent and dependent research and monitoring.

Data required for assessment is obtained from a variety of sources, including fishery dependent and fishery independent data.

Native oyster permit holders are required to complete a Native Oyster Fishery Logbook daily. This catch logbook of designated beds in Georges Bay, St Helens, must be completed within 24 hours of landing oysters and contain the following catch data:

- Date harvested
- Dive start and finish time
- Blocks fished
- Numbers of oysters landed (dozens)

- Name of processing facility receiving the oysters

The penalties for breaching a permit condition by not completing logbook information as required are a significant deterrent to overfishing or under declaring catch.

Fishery independent information was most recently collected for length frequency (see Table 2) during a survey conducted of the main beds of Georges Bay by the fishery manager in April 2003. This survey was designed by the Section Leader - Resource Modelling and Wild Fisheries Program Leader from the Tasmanian Aquaculture and Fisheries Institute. Historical survey information dating from the late 1980s is also available.

The collection of fishery independent information is restricted due to the developing nature of the native oyster fishery, its low economic value and the small number of participants. The allocation of resources for extensive scientific research can only be justified where the potential for a substantial industry can be demonstrated and where the financial return to the state from the fishery is likely to generate enough revenue to fund its ongoing management and research.

Distribution (see Attachment 1) and abundance (Table 2) information has been collated from Technical Reports compiled by various research institutes. Specific information about recruitment and size and age at maturity is not available, however post larval settlement observed during the 2003 survey indicated healthy levels of recruitment around the surveyed oyster beds.

B.1.1.2-5 Assessment

1.1.2 There is a robust assessment of the dynamics and status of the species/fishery and periodic review of the process and the data collected. Assessment should include a process to identify any reduction in biological diversity and/or reproductive capacity. Review should take place at regular intervals but at least every three years.

The surveys of the Native oyster fishery in Georges Bay, St Helens have been conducted prior to the opening of the fishery. The Department of Sea Fisheries, Marine Research

Laboratories undertook surveys in the late 1980's and early 1990's to determine density/size distribution estimates. The 1991 survey indicated that there were approximately 24 million native oysters in excess of 50 mm in the bay. Numbers of oysters in the areas of Georges Bay closed to shellfish harvesting are minimal.

Up until 1998, there have been two allocations of one million oysters. On both of these occasions, the total catch for the fishery was considerably less than expected.

Each of the individual beds were surveyed in 2003 to ascertain size distribution and density of oysters. The size distribution differed noticeably between beds. Those on the main bed had a mode of approximately 82 mm diameter with a median diameter of 84 mm, on the eastern bed the distribution was relatively flat with a mode of approximately 74 mm and a median diameter of 79 mm. On the bed at Akaroa, the oysters were significantly larger with a mode of approximately 118 mm and a median diameter of 119 mm. The average density for the main bed was 64 per 0.25 m², 76 per 0.25 m² and 57 per 0.25 m² for Akaroa. (This density does not include any fish under 40 mm).

Two participants have continued with the fishery on a small scale under the authority of permits. These permits fixed the catch allocation at 1200 dozen oysters for each permit. The permit initially is for a period of three months and the holder can apply for additional permits should the market demand for oysters exceed the 1200 dozen in that time period.

Information on the effect on biodiversity from this small fishery is not readily available. The fishery is concentrated on oysters that occur in localised concentration or clumps of beds within specific geographic areas. It is expected that any effect to the biodiversity would be limited to isolated smaller beds that may be fished beyond their maximum yield, that is the fisher does not consider the bed viable for further exploitation. There is no evidence of local depletions occurring in the current fishery. Monitoring of this is via catch and effort information and surveys conducted every two years.

The complexity of the interrelationships between the various bivalves and invertebrates that inhabit these beds would require extensive survey and assessment to provide any meaningful information. The size and value of this fishery does not currently justify expending the significant resources this would require.

Research into the reproductive capacity has shown that the fecundity of bivalves is very high, although this also corresponds to a high mortality rate in the larval dispersion stage. Combined with the specificity of settlement of the larvae, this may result in an extended time period for recolonisation of the bed or the possibility of recolonisation occurring in a new location.

No research has been conducted specifically conducted on the spawning of wild native oysters in Georges Bay, however information from harvesters indicate that the likely spawning time is between November to January.

The natural mortality rate for larger oysters (over 70 mm) that have successfully settled ranges was found to be between 5 – 18.3 %, (Mitchell, 1997). This figure was considered when catch levels and permit conditions were being finalised.

1.1.3 The distribution and spatial structure of the stock(s) has been established and factored into management responses.

Surveys of the distribution of native oysters have generally been concentrated in shallow coastal and estuarine regions. These surveys failed to find any other areas with beds of comparable size to those in Georges Bay. The fishery for native oysters is presently restricted to the surveyed beds in Georges Bay. It is not envisaged that stocks in other areas will be considered for commercial harvesting without extensive preliminary survey work.

Fishers who have held past permits to take native oysters by diving have reported that other beds exist in deeper waters around the state. In Georges Bay, beds of native oysters cover both the flat intertidal regions and the deeper channels.

Catch per unit effort is monitored in the fishery via catch returns. In the surveyed main beds of Georges Bay, the oysters are relatively evenly distributed and are easily fished. Therefore the pattern is that permit holders fish selectively over the entire fishing area. This means that CPUE provides a general indication of fishing effort but cannot be relied on as an accurate indicator of stock abundance.

1.1.4 *There are reliable estimates of all removals, including commercial (landings and discards), recreational and indigenous, from the fished stock. These estimates have been factored into stock assessments and target species catch levels.*

There is reliable information about commercial catches taken during the open fisheries from 1994, 1997, 1998 and the continued permit fishery.

Fishers operating under a current permit must lodge daily catch returns within 24 hours of landing and are restricted to permit allocations of 1200 dozen.

Recreational and indigenous fishing for native oysters around the state is believed to be negligible and in the shallower beds than those fished by the commercial permit holders. A recreational bag and possession limit for *Ostrea angasi* of 50 oysters per person per day was introduced in 2001. This daily limit also applies to indigenous fishers, unless they wish to apply for a special permit for a particular cultural event. In the past year, only one indigenous cultural activity involved the taking of native oysters, and this was at an extremely low level.

Indications from police prosecutions are that levels of illegal fishing for native oysters are also negligible.

Table 1. Harvesting History Native Oysters Georges Bay

CATCH BY YEAR (DOZENS)	
1994	3595
1995	200
1996	0
1997	2845
1998	8594
1999	2090
2000	0
2001	1687
2002	5215
2003	2765
Total	26991

1.1.5 There is a sound estimate of the potential productivity of the fished stock/s and the proportion that could be harvested.

The most recent survey of Georges Bay was conducted in April 2003 and estimated that there were approximately 900,000 dozen oysters on the three major beds, all greater than 40 mm. The survey did not include two other known beds and oysters generally distributed throughout the sandbars in other areas of Georges Bay to which fishers also have access. Based on the results of this survey, a conservative catch level of one-sixth of the total biomass has been set for this species by the fishery manager (equating to 150,000 dozen) as available for harvest. For precautionary reasons, and because historical catches taken have been lower than this, an annual catch level of 5,000 dozen per fisher will apply from March 2004. This catch level will be reviewed at least annually or may be reviewed during the harvesting year if necessary. Increased market demand is also considered by the fishery manager to be a legitimate reason for review of catch levels. The limit of two harvesters will remain after this date as will current management arrangements for recreational and indigenous harvesters.

High levels of recruitment were noted during the 2003 survey, but this was not formally recorded in the survey results for practical reasons and because the primary intent of the survey was to concentrate on oysters above 40 mm. The recommendation of the TAFI population dynamicist that any harvesting strategy should take into account the relative distribution of sized animals which differed markedly between beds is reflected in the setting of a 70 mm size limit.

Table 2. Native Oysters Georges Bay Density Survey April 2003
(see map of main beds at Attachment 1)

	Main Bed	Eastern Bed	Akaroa
	Dozens	Dozens	Dozens
Average Density on Bed	428,400	226,794	247,000

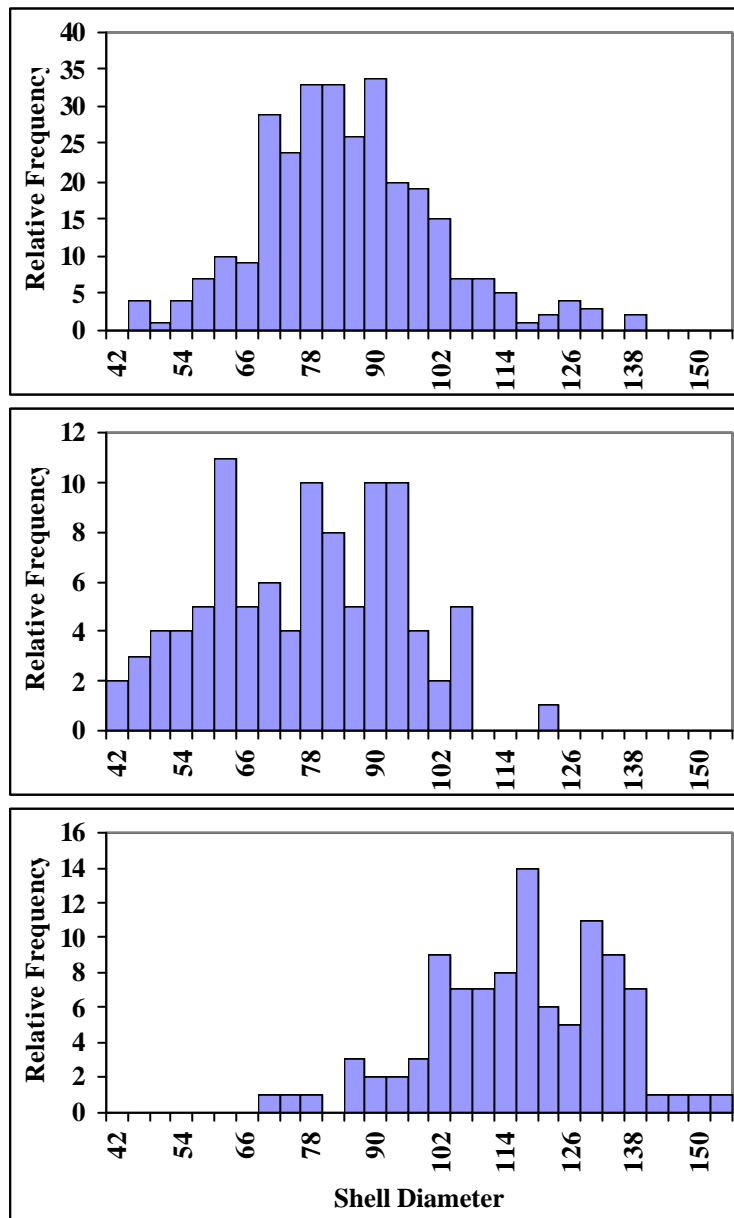


Figure 1. Relative size distribution of all samples taken from the three beds of native oysters in George’s Bay (see map in Attachment 1). For each quadrat sampled, the number of oysters larger than 40 mm were counted and measured. The top panel refers to the Main bed, the central panel relates to the Eastern bed, while the bottom panel refers to the samples from Akaroa.

B.1.1.6-9 Management responses

1.1.6 *There are reference points (target and/or limit), that trigger management actions including a biological bottom line and/or a catch or effort upper limit beyond which the stock should not be taken.*

Due to its status as a developing fishery, formal trigger points have not been developed. The main response to reaching upper levels for catch and effort in the fishery is to vary, or if necessary, not issue further permits. Other indicators in the fishery which may prompt management action include significant changes in density, indications of poor recruitment or high rates of natural mortality. Any such changes would be indicated through catch returns and information received from fishers.

The management responses to indications of changes in the fishery could be to authorise one or more of the following actions:

- Introduce appropriate commercial catch, following resurvey of fishing area.
- Introduce or change the size limits on a regional basis.
- Introduce area or seasonal closures.
- Other appropriate management measures.

If survey work determines that immediate action is required (by serious or high level change in one of the changes mentioned above), the Minister can respond by making emergency changes under the provisions of the Act.

1.1.7 *There are management strategies in place capable of controlling the level of take.*

Input controls include a limit on the number of fishers participating in the fishery, their level of catch and the size limit on the taking of the oysters. The size limit was set at 70 mm to protect adult breeding stock and was also acceptable to industry as oysters are not marketed below this size. There is also a recreational bag limit of 50 oysters per person per day.

1.1.8 Fishing is conducted in a manner that does not threaten stocks of by-product species.

In Georges Bay, the oysters are harvested by hand by a diver. Other species taken incidentally as bycatch are negligible, consisting primarily of minute quantities of invertebrate species such as sponges, weeds and worms attached to the oyster shell.

1.1.9 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

Although still at an early stage in the development of this minor fishery, the management regime appears on track to meet major objectives. It is difficult to foresee any external factors which may have uncontrollable impact on this minor, inshore fishery. The ultimate protection, because the fishery is controlled by short term permit and fishers do not have the access rights conferred by a licence, is that fishing can cease absolutely at the end of each permit period, or be revoked by the Minister during the period of the permit. Long term access to fisheries granted by permit is not guaranteed. Should the fishery progress to becoming a viable commercial fishery, it is expected that trigger points will be established.

B.1.2 Objective 2.

Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes.

B.1.2.1-2 Management responses

1.2.1 A precautionary recovery strategy is in place specifying management actions, or staged management responses, which are linked to reference points. The recovery strategy should apply until the stock recovers, and should aim for recovery within a specific time period appropriate to the biology of the stock.

Currently not applicable as reference points have not been established because the fishery is still in the development stage.

To comply with the objectives of *the Living Marine Resource Management Act 1995*, the Minister must take appropriate action to ensure a fishery is managed sustainably. The Act provides powers to review or revoke management plans or to take emergency action to rectify threatening actions.

1.2.2 If the stock is estimated as being at or below the biological and / or effort bottom line, management responses such as a zero targeted catch, temporary fishery closure or a 'whole of fishery' effort or quota reduction are implemented.

Currently not applicable.

B.2 PRINCIPLE 2.

Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.

B.2.1 Objective 1.

The fishery is conducted in a manner that does not threaten bycatch species.

B.2.1.1 Information requirements

2.1.1 Reliable information, appropriate to the scale of the fishery, is collected on the composition and abundance of bycatch.

No structured information is collected on bycatch species, which are negligible for the native oyster fishery. Incidental observations have been made by research staff on composition of bycatch during survey and assessment work undertaken.

B.2.1.2 *Assessments*

2.1.2 *There is a risk analysis of the bycatch with respect to its vulnerability to fishing.*

There are no specific assessments or risk analysis on bycatch species as their take has been found to be infinitesimal. The oyster fishing beds in Georges Bay occupy, proportionally, a very small area of Georges Bay and an insignificant area of the similar coastal regions throughout the state where the incidental invertebrate bycatch species from this fishery also occur.

B.2.1.3-6 *Management responses*

2.1.3 *Measures are in place to avoid capture and mortality of bycatch species unless it is determined that the level of catch is sustainable (except in relation to endangered, threatened or protected species). Steps must be taken to develop suitable technology if none is available.*

Oysters are taken by hand by a diver, sorted at sea and any larger bycatch returned to the water where possible. This fishing method is the most effective way to prevent bycatch being taken and has the least impact on oyster habitat. In the past, native oysters were taken by dredging.

2.1.4 *An indicator group of bycatch species is monitored.*

Not currently applicable. None of the bycatch species are taken in sufficient numbers to warrant monitoring in this manner. At present, there is no intention to determine if any of the bycatch species are good indicator species.

2.1.5 *There are decision rules that trigger additional management measures when there are significant perturbations in the indicator species numbers.*

Not applicable at this stage.

2.1.6 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

Not applicable at this stage. However, the Act provides for amendments to management plan and emergency responses that could be used to protect a species that was perceived to be under threat. In the absence of a continuous, targeted research program to monitor bycatch species, it is likely that in the first instance the Department would become aware of any concerns via anecdotal information from fishers or from the catch sampling program.

B.2.2 Objective 2.

The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities.

Not applicable as there is no interaction between this fishery and any known endangered, threatened or protected species at this stage.

B.2.3 Objective 3.

The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally.

B.2.3.1 Information requirements

2.3.1 Information appropriate for the analysis in 2.3.2 is collated and/or collected covering the fisheries impact on the ecosystem and environment generally.

The impact on the ecosystem and environment generally from the removal of oysters from the beds in Georges Bay is negligible. The scale of the fishery is such that information is not currently collected in regard to this.

There is historical information on the distribution of oysters in the Bay and specific locations of major beds, pattern of oyster distribution in the fishery is being monitored over time. In addition, research staff at the Tasmanian Aquaculture and Fisheries Institute have conducted habitat mapping throughout Georges Bay (see Attachment 4), providing a baseline reference for this area.

B.2.3 Assessment

2.3.2 Information is collected and a risk analysis, appropriate to the scale of the fishery and its potential impacts, is conducted into the susceptibility of each of the following ecosystem components to the fishery.

1. Impacts on ecological communities

- *Benthic communities*
- *Ecologically related, associated or dependent species*
- *Water column communities*

2. Impacts on food chains

- *Structure*
- *Productivity/flows*

3. Impacts on the physical environment

- *Physical habitat*
- *Water quality*

Native oyster populations prefer constant submersion and tend to be found below the low-tide mark. Their preferred habitat includes sheltered silt and sand (Mitchell et al, 1997) (see Georges Bay Habitat Map at Attachment 4) and in Georges Bay are found clumped in close proximity to other shellfish beds. No information about the role of native oysters in the ecosystem or the effect of their removal has been gathered at this time due to the small scale of the fishery.

B.2.3.3-5 *Management responses*

2.3.3 *Management actions are in place to ensure significant damage to ecosystems does not arise from the impacts described in 2.3.1.*

Not applicable.

2.3.4 *There are decision rules that trigger further management responses when monitoring detects impacts on selected ecosystem indicators beyond a predetermined level, or where action is indicated by application of the precautionary approach.*

No management responses are required at this time.

2.3.5 *The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.*

Not applicable.

C REFERENCES

Anon. 1995. *Market Evaluation of the Native Oyster Resource in Georges Bay, St Helens*.

Dix, Trevor G, *Laboratory Rearing of Larval Ostrea Angasi in Tasmania, Australia (1976)*, Fisheries Research Laboratory, Taroona.

Draft Policy on the Harvest of Native 'Flat' Oysters (O. angasi) 1996, Department of Primary Industry and Fisheries, Tasmania.

Mitchell, Iona M, Crawford, Christine M and Rushton, Michael J (1997), *Flat oyster (Ostrea angasi) growth rates, Georges Bay, St Helens (Tasmania) February 1994-95*. Technical Report, Marine Research Laboratories – Taroona, Marine Resources Division, Department of Primary Industry and Fisheries, Tasmania.

Mitchell, Iona, Jones, Andrew and Crawford, Christine (June 2000), *Distribution of Feral Pacific Oysters and Environmental Conditions*. Natural Heritage Trust Final Report.

Wilson, John (April 1991), *Survey of the Flat Oyster Stocks in Georges Bay*, Report, Sea Fisheries Division, Department of Primary Industry.

D GLOSSARY OF ABBREVIATIONS

TAFI – Tasmanian Aquaculture and Fisheries Institute

TAC – Tasmanian Aquaculture Council

TFIC – Tasmanian Fishing Industry Council

TSQAP – Tasmanian Shellfish Quality Assurance Program

FOCP – Flat Oyster Culture Program

DPIWE – Department of Primary Industries, Water and Environment

'The Act' – The *Living Marine Resources Management Act 1995*

'The Minister' – The Minister for Primary Industries, Water and Environment

E ATTACHMENTS

1. Map of permit holder harvesting areas in Georges Bay, St Helens (current and historical)
2. Example of permit issued under Section 14 of *Living Marine Resources Management Act 1995*
3. Example of catch logsheet
4. Georges Bay habitat map
5. Photos of native oyster habitats and harvesting operation