

AQUACULTURE OPPORTUNITIES — A NEW LOOK

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(with three tables and two text-figures)

Tasman Peninsula, with its extensive coastline, low population density and lack of industrial development, offers significant marine farming opportunities. Sheltered stable waters provide, *prima facie*, ideal sites for both shallow-water and deep-water cultivation activities. Three species are farmed at present — the Pacific oyster *Crassostrea gigas*, mussel *Mytilus edulis planulatus* and rainbow trout *Salmo gairdneri*. Four other species offer immediate prospects for cultivation — the flat oyster *Ostrea angasi*, scallops *Pecten fumata*, abalone *Haliotis ruber* and Atlantic salmon *Salmo salar*. Other opportunities include seaweed cultivation and flatfish. Current and potential production and employment opportunities from aquaculture activities are projected. Basic details relating to farm size and land-based infrastructure requirements are outlined.

Key Words: Tasman Peninsula, Tasmania, aquaculture

From SMITH, S.J. (Ed.), 1989: *IS HISTORY ENOUGH? PAST, PRESENT AND FUTURE USE OF THE RESOURCES OF TASMAN PENINSULA*. Royal Society of Tasmania, Hobart: 121–125.

INTRODUCTION

The Tasman municipality is distinctive amongst other Tasmanian mainland municipalities by being practically surrounded by water. With few permanent streams the peninsula offers a coastline varying from shallow gently sloping intertidal sandy bays to protected deepwater bays and exposed rough oceanic conditions. Other mitigating factors suggesting *prima facie* suitability for mariculture include little or no pollution, a relatively low population density and good public service networks such as roads, telephones and power.

MARINE FARMING REQUIREMENTS

There are legislative, regulatory and administrative considerations that must be encountered before marine farming can begin. Rights must be obtained to engage in farming in a particular area; this involves a lease for shallow waters or a permit for deep-water culture and a licence. For all marine waters the administrative responsibility lies with the Department of Sea Fisheries from powers devolved from the *Fisheries*

Act 1959. It should also be borne in mind that aquaculture is a business which requires a considerable amount of capital to create a viable income and involves utilising technically advanced skills.

Selection of a site is of fundamental importance and, as aquaculture has developed, available shallow-water intertidal sites have become scarcer, particularly as other demands on these waterways are also increasing. Deeper water farming sites are generally subject to fewer competing demands, although existing navigation rights and public health considerations must take precedence over site suitability.

The selection procedure must take into account the species to be farmed; market demand and supply, skills required, venture finance and site availability all play a role in the selection.

Pacific oysters *Crassostrea gigas* are cultured in both shallow and deep-water areas. Mussels *Mytilus edulis planulatus* are generally cultured under rafts and longlines in deep water. Rainbow trout *Salmo gairdneri* and Atlantic salmon *Salmo salar* are cultured in cages in sheltered deep-water sites. The animal farmed must be able to grow well in the selected area.

The method of farming is an important consideration, as are physical factors such as shelter,

depth, accessibility and services. Structures must be able to withstand prevailing weather and water conditions, and a depot may be needed near the site.

Personal factors relating to residential needs, ease of access and social factors should be considered. Any or all of the following may claim an *a priori* interest in a particular area: (1) commercial or recreational fishermen, (2) yachtsmen or others engaged in water sports, and (3) government and semi-government instrumentalities with interests in the area, such as the Department of Lands, Parks and Wildlife.

Finally, environmental factors must be examined in relation to pollution from sewage and adjacent agricultural land-use.

Once a site has been selected a sequence of consultative and mandatory steps must be followed, as shown in figure 1.

MARINE FARMING ACTIVITIES

Current activity on the peninsula is indicated in figure 2, and summarised in table 1. Clearly with current farms reaching full production there will be substantial growth. Employment consequences of marine farming are summarised in table 2.

Marine farming therefore can contribute to employment on the peninsula, although it is fair to point out that half of the jobs created indirectly would be placed somewhere else. There are no fish-processing facilities in the municipality and, given current efficiency of the transport system, they are unlikely to be established in the near future.

Investment levels required to establish aquaculture industries are indicated in table 3. They include start-up costs and costs of aquatic and shore facilities.

ADVERSE CONSEQUENCES OF MARINE FARMING

To balance the equation one must consider the less desirable consequences of developing marine farms. I believe these fall into six categories:

- (1) Some loss of areas of water and of the sea bed is involved. Marine farmers are granted leasing rights for up to 20 years. These are usually situated in relatively sheltered inshore bays. The percentage of area occupied by the farm is usually small compared to the total available area.
- (2) The activity necessarily changes the traditional pattern of use which can largely be described as

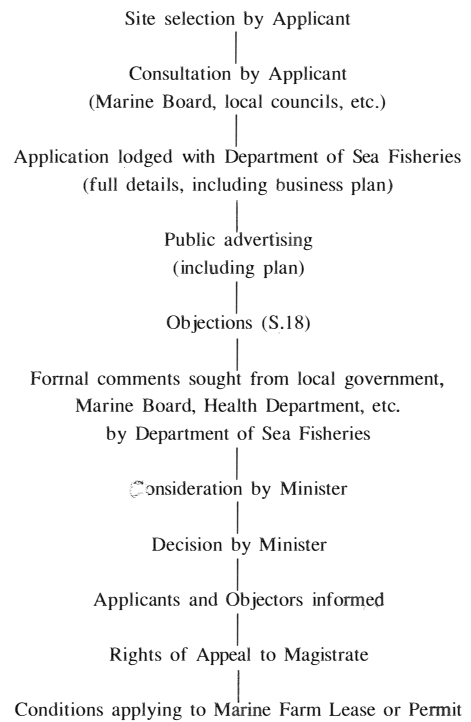


FIG. 1 — Procedure involved in granting of a Marine Farm Lease or Permit.

TABLE 1
Marine Farming on Tasman Peninsula

Species	Annual production (thousands of dozens)	Production at full capacity (thousands of dozens)
Pacific oysters & flat oysters	20-50	120 000
Mussels	5-10+	70+
Rainbow trout	50+	500+
Atlantic salmon	Nil	500+

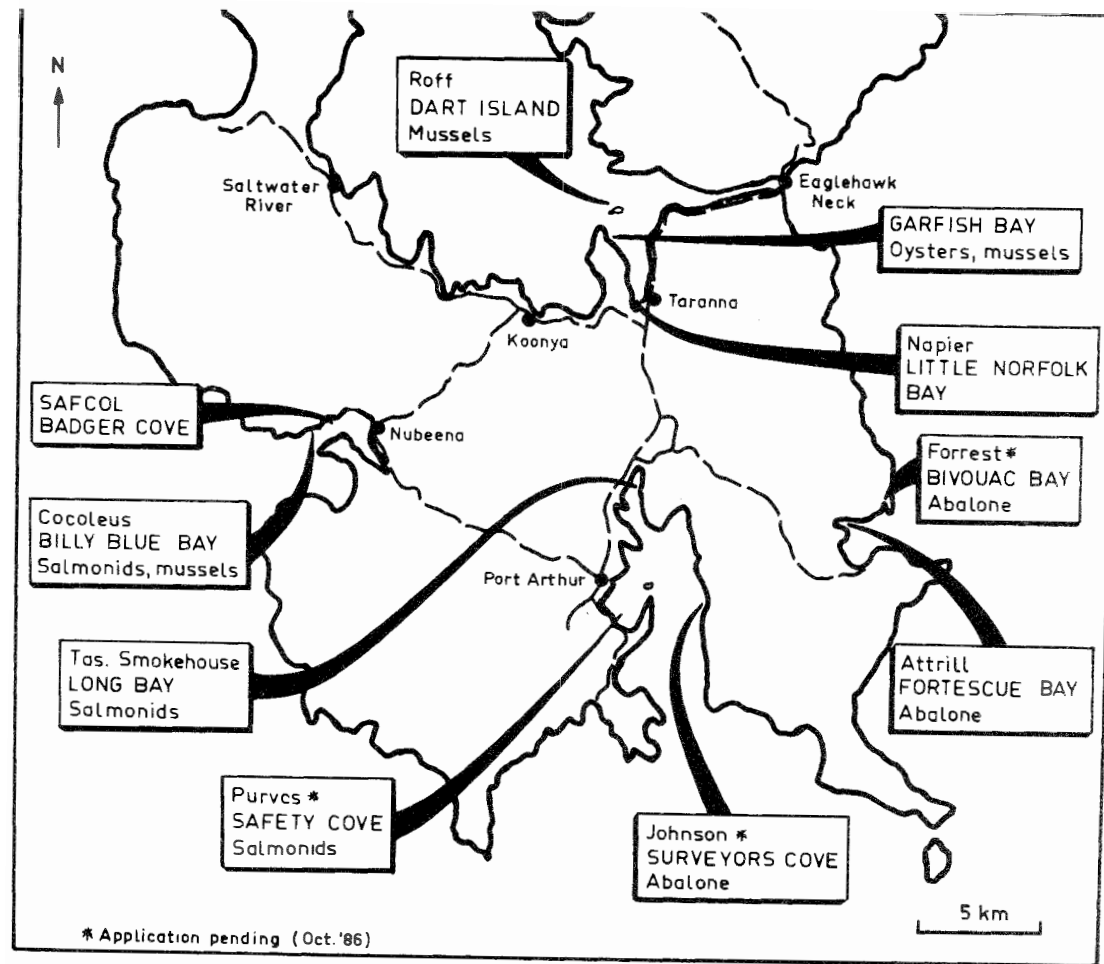


FIG. 2 — Marine farming locations on the Tasman Peninsula.

TABLE 2
Employment Related to Marine Farming, Tasman Peninsula

Species	Area	Annual production	FIE**	
			D	I
Pacific & flat oysters	12 ha	100 000 doz.	4	10
Mussels	7 ha	100 tonnes	3	7.5
Rainbow trout	2.5 ha	100 tonnes	4	10
Atlantic salmon	2.5 ha	100 tonnes	4	10

*Assume suitable area.
**Full time equivalent using 2:5:1 multiplier effect. D – direct, I – indirect jobs created

passive recreational — aesthetic — or active recreational — fishing and aquatic sports.
(3) Farms require some facility ashore. This infrastructure and the associated activity are again likely to differ from traditional use patterns.
(4) Farm working patterns, relating in some cases to tidal patterns, can cause, through noise and light, some disturbance to neighbouring residents.
(5) Environmental and water chemistry changes may result from intensive marine farming activity. These may be manifested as an increase in localised sedimentation rate in the vicinity of the farm or as increased growth of seaweeds due to higher levels of nitrates and phosphates.
(6) Farmed species may spread naturally to nearby coastal areas. Some of the species being farmed and

suitable for farming are exotic and the potential exists for opportunistic colonisation from uncontrolled breeding. To date there is little or no history of this in the Tasman municipality, presumably because environmental conditions have not been suitable for successful breeding of farmed species.

FUTURE PROSPECTS

Full development of existing marine farms will significantly contribute to the economy of the region. They will provide a diversity of employment opportunities and a spread of the commercial base of the municipality.

TABLE 3
Start-Up Costs and Costs of Facilities

Species	Area	Average annual production	Investment
Pacific oysters & flat oysters	12 ha	100 000 doz.	\$150 000
Mussels	7 ha	100 tonnes	\$200 000
Rainbow trout	2.5 ha	100 tonnes	\$450 000
Atlantic salmon	2.5 ha	100 tonnes	\$550 000

There is scope for reducing some of the less desirable consequences of marine farming. Farm technological changes may minimise intrusion on the water surface by development of subsurface farms anchored to the sea bottom. Breeding trials to develop polyploid (sterile) strains of fish are being conducted. If commercially successful the risk of colonisation of nearby areas will be eliminated.

Expansion of marine farm activity from existing farms is possible using endemic species. Prospects for abalone farming in deep-water sites and in tanks on land are improving as research identifies and resolves constraints. Sea-bed culture, particularly of shellfish, scallops and oysters, has exciting possibilities. This technology will interface between intensive rearing of juveniles under controlled

conditions and the traditional dredge harvesting industry, by sea ranching of bottom seed individuals.

CONCLUSION

Some expansion of marine farming activity leading to greater local employment and investment is likely. Limited extension to other areas is possible, subject to constraints outlined in this paper. Introduction of new techniques could increase production volumes without significantly increasing disturbance to traditional land use and activity patterns.

Marine farming has a modest role to play in the future development of the peninsula. Employment and commercial diversity are its greatest attractions.