Chapter 14

FORESTRY AND COMMERCIAL FISHING

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In Tasmania primary industry is the dominant contributing sector to the State's economy. Agriculture and mining, with forestry through the manufactured value of paper, paper pulp, woodchips and sawn timber and the developing fishing industry provide in excess of 75 per cent of the State's economic base.

Because Tasmania's forests provide such a significant slice of the State's manufacturing and export income, forest management and conservation policies have been subject to intensive public scrutiny and debate over recent years.

Tasmania's fishing industry has been expanding over the last 20 years or so. Acquaculture has become an industry of considerable potential with species such as Atlantic salmon, sea trout and oysters, providing new ventures and export markets. The first full season of fishing for jack mackerel confirmed the presence of a significant and exploitable resource, while abalone and orange roughy are other relatively new species having a significant commercial value.

14.1 FORESTRY

Tasmania is unique amongst Australian States in its concentration of forest resources. No other State has similar widespread conditions conducive to forest growth: a cool temperate climate and a reliable rainfall varying locally from 500 to 3 800 millimetres with relatively small seasonal variation. Although land clearing, timber exploitation and fires have left their mark, the Forestry Commission estimates that the current total forest area (including some forest of little or no commercial value) is 2 988 400 hectares or about 44 per cent of the State's total area.

14.1.1 Forests, Timbers and Plantations

Forests

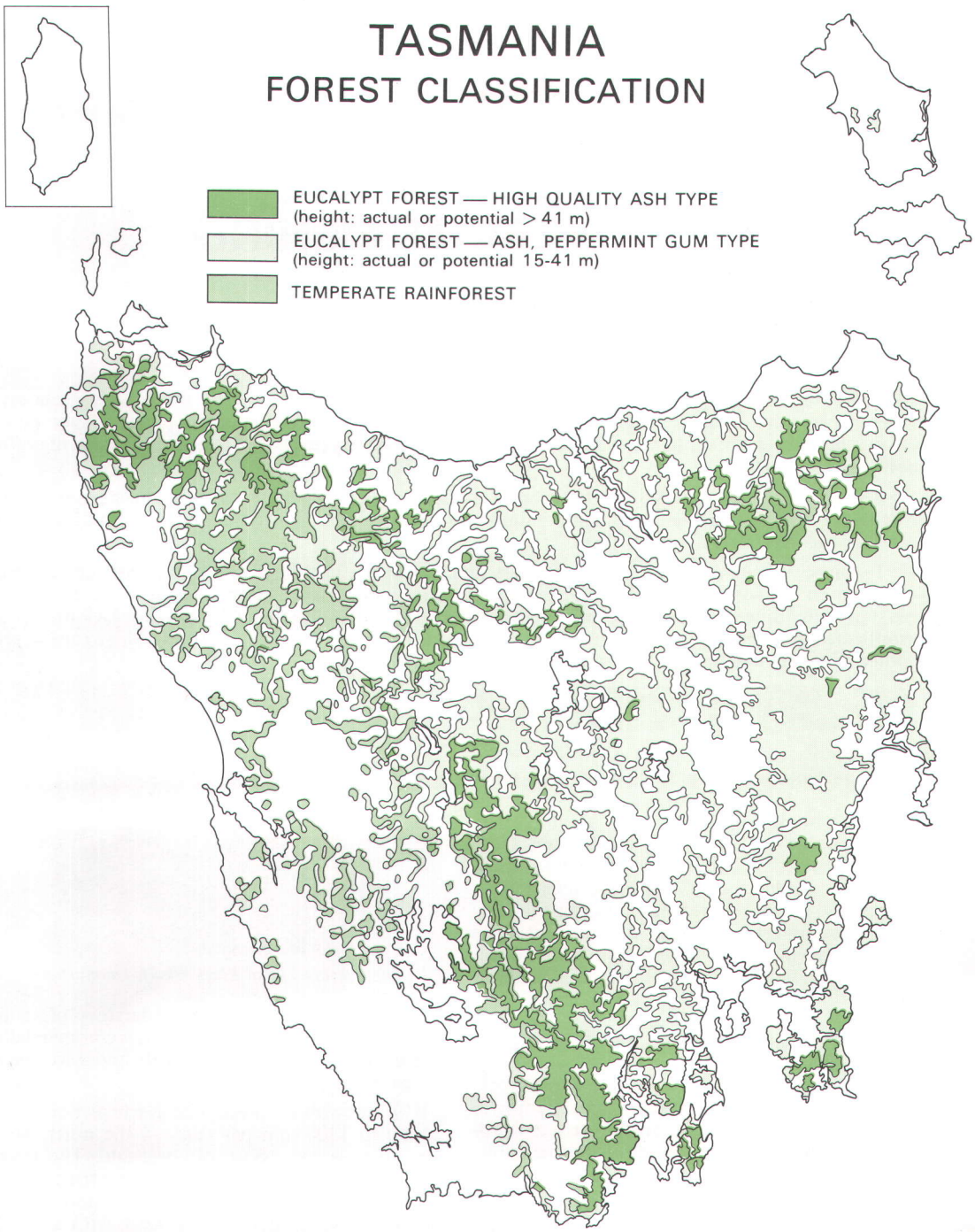
Three main vegetation types, dry sclerophyll, wet sclerophyll and mixed forest form the productive, commercially harvested native forest estate.

Dry sclerophyll forests occur where rainfall is between 500 and 1200 mm per year. One or two eucalypt species usually dominate the canopy; for example gum top stringybark or white top stringybark (*Eucalyptus delegatensis*), and white gum (*E.viminalis*) with an understory of small trees and shrubs. This forest type is commercially important in the central north and east coast regions.

Fishing boats tied up at Kings Wharf, Launceston

Wet sclerophyll forests occur where rainfall is 1000 to 1300 mm per year, in the north east, north west and south of the State. The main canopy species include gum top stringybark, brown top stringybark (*E.obliqua*) and stringy gum or swamp gum (*E.regnans*), with a dense understory of small trees, shrubs and ferns.

Mixed forests consist of a tall eucalypt canopy with an understory of rainforest species including


TASMANIA
FOREST CLASSIFICATION
EUCALYPT FOREST — HIGH QUALITY ASH TYPE
(height: actual or potential > 41 m)
EUCALYPT FOREST — ASH, PEPPERMINT GUM TYPE
(height: actual or potential 15-41 m)
TEMPERATE RAINFOREST

myrtle, sassafras, leatherwood and celery top pine. These forests occur where rainfall is more than 1200 mm per year, concentrated in wetter, more fertile areas in the west and south, with scattered pockets in the north east.

In areas of high rainfall, of about 1500 mm or more, with relatively low fire frequency, and suitable soils, temperate rainforests are found. These are characterised by the dominance of myrtle (*Nothofagus cunninghamii*), sassafras (*Atherosperma moschatum*) and leatherwood (*Eucryphia lucida*). No timber harvesting operations occur in stands of pure rainforest. Blackwood (*Acacia melanoxylon*) grows where rainforest has been disturbed in the past, principally by fires, in the north-west around Smithton.

The forests are often classified according to their ages. They can be oldgrowth or regrowth forests.

Oldgrowth Forests: The main canopy trees are usually older than 110 years and show signs of old age through damage and decay. They often have hollow butts, gaps in the crown, large twisted or dead limbs, or hollow branch stubs. Oldgrowth forests are generally overmature, having stopped actively growing.

Regrowth Forests: The main canopy trees are less than 110 years old and the forest is still growing vigorously. The trees look healthy with few signs of decay. Regrowth forests mainly occur as a result of past logging and wildfires.

Timbers

Hardwoods: The most valuable eucalypts are those which belong to the 'ash' group; stringybark (*Eucalyptus obliqua*), gum top stringybark or alpine ash (*Eucalyptus delegatensis*) and swamp gum or mountain ash (*Eucalyptus regnans*). In the south and south-east Tasmanian blue gum (*Eucalyptus globulus*) occurs in high quality forests. In areas where the annual rainfall is below 760 mm the more important eucalypts are black peppermint (*Eucalyptus amygdalina*), swamp or black gum (*Eucalyptus ovata*), white gum (*Eucalyptus viminalis*), stringybark (*Eucalyptus obliqua*) and white peppermint (*Eucalyptus linearis*).

Tasmania has 11 tree types that are suitable for use as pulpwood, of which ten are eucalypts. The other is myrtle, a rainforest hardwood available in the north-west of the island. The eucalypts are graded by quality:

- First quality ('ashes'); stringybark, gum top stringybark, swamp gum and ironbark.
- Second quality ('gums'); white gum, blue gum and swamp or black gum.
- Third quality ('peppermints'); black peppermint, white peppermint and silver peppermint.

The gum top stringybark and stringybark account for over 60 per cent of all eucalypt logs cut for woodchipping.

Softwoods: Although Tasmania's native forests produce some very valuable softwood timber, including King Billy pine, Huon pine and celery top pine, they are very slow growing and in short supply. For these and other reasons, attention has been given to building up another section of the total forest estate by growing plantations of exotic species.

Plantations

Fast-grown softwood plantations have been established in State forest initially to fill an expected sawlog scarcity. In addition, these softwood plantations yield a long-fibred pulp which is a requirement of paper production. Softwood plantations cover less than 2.4 per cent of State forest area and radiata pine (*Pinus radiata*) is the principal species planted. An increasing area of native hardwood plantations has been established in recent years.

There have been two stages in the establishment of the State's softwood plantations. The first involved planting on derelict farmland which had reverted to scrub and bracken following early agricultural practices. Undertaken during the period between 1935 and 1960, its goal was to produce sawlogs in the shortest possible time to bridge an anticipated shortfall in hardwood sawlog availability in the 1980s and 1990s.

The second stage began in 1961. The continuing demand for long-fibre conifer pulpwood, to serve an expanding pulp and paper industry, saw the extension of planting into areas of low quality native forest. Radiata pine plantations now provide a large part of Australian-grown wood supplies. Large-scale establishment of these plantations was commenced by State Governments early this century. In the 11-year period covered by the *Federal Softwood Forestry Agreement Acts* 1967, 1972 and 1976, the Commonwealth provided financial assistance to the State for an extended program of softwood plantation development. An extension to the Act in 1978 provided funds for maintenance of the plantations already established for another five years.

In 1987 Tasmanian State forest plantations comprised 38 300 hectares of softwoods and 3 868 hectares of hardwoods. Most softwood plantations are in the Fingal, Scottsdale, Devonport and Burnie districts, while hardwoods are distributed more widely.

14.1.2 Ownership and Control

Of the total forest area of 2 988 400 hectares, 40 per cent is in State Forest, 23 per cent is privately owned, 22 per cent is Crown Land and 13 per cent is in Crown reserves. The need for permanent reservation of land for timber production was first given statutory recognition with the *Waste Lands Act* 1881. A program of acquisition of land suitable for dedication as State forest has seen the gazetted area reach 1 601 007 hectares at 30 June, 1987.

14.1 TENURE OF FOREST AREA ('000 ha)

Tenure	*High quality eucalypt*	*Low quality eucalypt*	*Rain forest*	*Plantations*
State forest	370.0	710.0	168.1	41.9
Forest reserves	3.7	6.9	1.2	–
Crown land	33.7	364.9	199.5	–
Crown reserves	26.8	248.5	100.4	–
HEC	8.8	47.0	4.2	–
Private property	26.0	608.7	25.3	41.2
Total	469.0	1 986.0	498.7	83.1

State forests: Tenure by the Forestry Commission under the *Forestry Act*, 1920.

Forest reserves: Areas provided for recreational, scientific, environmental and aesthetic purposes established within State forests.

Crown land: Unallocated land with tenure by the Department of Lands, Parks and Wildlife; wood production and sale controlled by the Forestry Commission.

Crown reserves: Principally National Parks and State Reserves administered under the *National Parks and Wildlife Act* 1970.

HEC: Land vested in the Hydro-Electric Commission.

Timber Concession and Reserve Areas

The establishment in Tasmania of various industries using forest resources has given rise to the need for some guarantee of assured timber supplies to those industries. Therefore, certain concessions and cutting rights on Crown lands have been awarded to companies relying on forest products as their raw matrials. Cutting rights apply only to Crown land and State forest within the concession boundaries. Concession areas are those areas where a company is at present allowed to operate while reserve areas are set aside for future use. Providing that the company meets certain stipulated conditions, permission to remove timber from the reserve area may be granted by the Forestry Commission.

14.1.3 Forest Utilisation

While sawmilling of native forest timbers had become a major part of Tasmanian industry by the mid nineteenth century, in recent years pulpwood for the manufacture of papers, and woodchips for export have become equally important forest based industries in terms of the volume of timber processed.

Establishment of the woodchip export industry and the expansion of other timber-using industries has resulted in greatly increased annual timber requirements necessitating careful utilisation of existing forest resources and the development of viable reforestation schemes. Integrated forest operations seek to maximise use of the forest resource by allocating the best logs as sawlogs, a lower grade as optional sawlogs and the remaining merchantable logs as pulpwood or woodchip timber. This strategy facilitates regeneration of the forest as most of the standing trees are removed through clear-felling, decreasing competition for existing nutrients and light.

Woodpulp and Paper

The manufacture in Tasmania of fine writing and printing papers commenced at Burnie in 1938 following technological developments allowing hardwood fibre to be used as a prime resource. In 1941 the first newsprint mill in Australia was established at Boyer on the Derwent. A further pulp and paper mill commenced operation at Wesley Vale near Devonport in 1970 producing magazine and directory grade papers. During the past fifteen years pulpwood produced for local processing into paper has shown only a gradual increase, in contrast to the doubling of the quantity of woodchips produced. Whereas in 1972–73 woodchips and pulp locally processed was 36.2 per cent of total production, in 1986–87 it had fallen to 25.9 per cent.

14.2 CHIPPED, GROUND AND FLAKED WOOD LOCALLY PROCESSED

Year	*Tonnes (green weight)*
1972–73	793 700
1976–77	832 000
1978–79	781 200
1980–81	1 073 600
1982–83	875 000
1984–85	900 300
1986–87	1 034 600

Woodchips

Tasmanian forests have been supplying woodchips for export under licence (mainly to Japan) since 1971. In 1972–73, 1.4 million tonnes of

chips were exported. By 1986–87 about 2.9 million tonnes of woodchips were being produced for export.

14.3 WOODCHIPS PRODUCED FOR EXPORT, TASMANIA

Year	*Tonnes (green weight)*
1972–73	1 397 200
1976–77	2 041 100
1978–79	2 196 600
1980–81	2 354 100
1982–83	2 293 300
1984–85	2 750 400
1986–87	2 957 300

Three companies currently hold export licences, APPM, its subsidiary Tasmanian Pulp and Forest Holdings and Forest Resources, and each were due for review by 1988.

Before renewing woodchip export licences, the Commonwealth Government required licence applicants to prepare an environmental impact statement.

This major document, the Environmental Impact Statement on Tasmanian Woodchip Exports beyond 1988, was commenced in early 1984 and a draft document was completed in June 1985 by the EIS Study Group that consisted of representatives from APPM, Forest Resources and the Forestry Commission. After a two-month period of public review the final report was prepared in the form of a Supplement to the draft document.

The Commonwealth Government granted 15-year licences to the woodchip export companies from 1988. The licence renewals have been granted with conditions that strict environmental standards must be followed, that yearly reports be prepared on activities and that companies comply with export licence conditions.

The Forest Practices Code

It has been recognised by all involved with forestry that it is important to care for environmental values during harvesting operations. To this end, a *Forest Practices Act* was passed in 1985 to ensure that forest operations are conducted in an environmentally acceptable manner on both Crown and private forest lands. The Code is part of a process for encouraging all sectors of the forest industry to progressively improve forest practices. The Code provides a set of standards to protect environmental values during forest operations and is designed to take a practical approach to protect numerous environment values.

14.4 MATERIAL USED IN CHIPPING, GRINDING AND FLAKING OF WOOD ('000 m³)

Year	*Logs*	*Sawmill offcuts*
1972–73	2 133.7	224.1
1976–77	2 913.2	248.2
1978–79	2 935.2	263.5
1980–81	3 369.8	308.8
1982–83	3 182.0	212.3
1984–85	3 594.7	266.7
1986–87	3 970.4	303.4

Timber

Sawmilling is Tasmania's oldest industry. Shortly after the colony was established in 1803, Government sawpits were in operation in Hobart. The first water powered sawmill was constructed in 1824 and by 1838 the colony was exporting around 900 m³ (roughly 300 000 super feet) of timber annually. The first steam powered mill was established in 1844 and 22 mills were in operation by 1859.

Expansion in the industry was slow until the 1890s when amendments to the *Crown Lands Act* sparked a rapid expansion, which continued until the mid 1920s. The depression seriously affected both employment and production, with output in 1931–32 falling to 32 per cent of what it had been in 1923–24.

From the mid 1930s to the 1970s the industry continued to expand. By 1974–75, the total log usage for sawing, peeling and slicing had reached over 1 million cubic metres. This was seen as too high. To prevent the possible eventual collapse of the industry, the Forestry Commission introduced reductions in the volume of sawlogs that millers could obtain from Crown forests. The first reduction of 20 per cent took place in 1977.

The reduced volume of hardwood milled was offset to some extent by a trebling in usage of plantation softwood logs. As well, since 1980 the volume of eucalypt used has fallen while that of blackwood, myrtle and sassafras from rain forests has increased.

14.5 LOGS USED IN SAWMILLING AND PLYWOOD ('000 m³)

Year	*Hardwood*	*Softwood*
1972–73	1 068.7	28.3
1976–77	894.8	91.7
1978–79	789.0	73.8
1980–81	807.1	185.1
1982–83	503.2	167.9
1984–85	631.4	212.9
1986–87	585.0	242.0

14.6 LOGS USED AND TIMBER PRODUCED ('000 m³)

Year	*Logs used*					*Timber produced*				
	Hardwoods		*Softwoods*			*Hardwoods*		*Softwoods*		
	Eucalypts	*Rain forest*	*Plan-tation*	*Natives*	*Total*	*Eucalypts*	*Rain forest*	*Plan-tation*	*Natives*	*Total*
1978–79	775.2	13.8	65.3	8.5	862.8	285.1	4.2	28.3	3.0	320.6
1980–81	780.7	26.4	178.9	6.2	992.2	289.4	8.9	73.2	2.4	373.9
1982–83	475.6	27.6	161.2	6.7	671.1	175.0	8.1	62.6	2.3	248.1
1984–85	611.9	19.4	207.0	5.8	844.2	227.7	5.7	79.1	2.0	314.5
1985–86	603.3	23.6	227.3	4.6	858.9	218.3	6.6	85.0	1.6	311.6
1986–87	559.9	25.1	236.2	5.8	827.0	195.4	7.1	94.9	1.9	299.3

Environmental Impact Statement

One of the most intensive investigations yet of the State's forest practices and forest industries ended in September 1985 with the completion of the Supplement to the draft Environmental Impact Statement on Tasmanian woodchip exports beyond 1988.

In June 1986 the State and the Commonwealth signed a joint memorandum relating to the export of woodchips from Tasmania.

This Memorandum of Understanding (MOU) provides a process by which a range of views is to be taken into account in making planning decisions. The State retained the right to determine land use, but it was agreed that the Commonwealth should have an opportunity to provide its views on aspects of forest management in certain areas. Of particular concern was the question of logging in State Forests which have been listed by the Australian Heritage Commission on its National Estate register. While it does not provide a procedure for resolution of all possible differences, the MOU provides a process for continuing improvements in forest management, for the issuing of licences for woodchip export, for research and development, and for taking into account values in sensitive multi-use areas.

The Forests as an Energy Resource

The oil replacement value of wood used for domestic space heating, and for thermal purposes like steam raising in industry, is $40 million annually. Over 85 000, or 53 per cent of all households, each burn an average of 6.6 tonnes of wood per year. The wood is mainly supplied from forest residues on private and Crown land. The increase in firewood demand has led to some increase in part-time and casual employment.

In the last two years there has been a substantial increase in the use of sawmill residues, such as green sawdust, as boiler fuel. The dairy, meat and vegetable-processing industries have been at the forefront of moves to install wood-fired boiler systems as a means of reducing operating costs. On King Island, seaweed (kelp) is now dried in kilns that are wood fired.

14.1.4 Forest Management and Research

The Forestry Commission is directly responsible for the management of Tasmania's State forests. The Australian Forestry Council, formed by the Australian and State Governments, coordinates national programs for the production, utilisation and conservation of Australian forests. Research into a range of resource and technological aspects of the forest-based industries is undertaken by the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

The major goal of forest policy is to achieve sustained production of sawlog and pulpwood as a basis for stable forest based industry.

The major goal for the native hardwood forests has been to achieve sustainable production of sawlogs and pulpwood as the basis of a stable forest sector economy. The means to achieve this goal include:

- Dedication of suitable areas as State forest, and rationalisation of State forest boundaries.
- Sound knowledge of the forests and careful planning. The Commission's Planning and Resources Branch collects information on the forests, their distribution, timber volumes and quality, age, species, growth rate and visual quality. This information is used to prepare management plans. Planning is the corner stone of the concept of forest production in perpetuity, or sustainable yield, as it involves the calculation of the timber volumes available for harvesting each year against the growth potential of the forests.

- Constructing roads into forest areas that provide access for timber harvesting, research, fire protection and public recreation.
- Regenerating logged areas. In wetter forests clearfelled for sawlogs and pulpwood, the usual practice is to burn logging debris then aerially sow with eucalypt seed of the species formerly on the site. However, in drier forests, where areas have been selectively logged, soil disturbance by logging machines is often sufficient to stimulate regeneration. In 1986-87, 5 839 ha were aerially seeded for regeneration.
- Protecting the forests from harmful pests and diseases through research and monitoring, and from wildfires through a system of early detection and swift suppression.

Plantations of softwoods and hardwoods are an intensive, high capital form of forest management that aims to produce volumes of timber quickly. As in native forests, establishment and management of plantations needs careful planning, roading, protection and harvesting.

New Commissioner

On 17 December 1986 Mr A.G. Skuja was appointed Chief Commissioner for Forests, replacing Mr J.R. Quick who had retired early in the year after five years in the position. Mr Skuja had been Commissioner (Management) prior to which he was Regional Forester North-West.

The Forestry Commission's responsibility for State forests was widened by the *Forestry Act* 1977, which empowered the Commission to promote the development and proper management of private forests. The Act provided for a Private Forestry Council to advise the Forestry Commission on private forestry and a Private Forestry Division to provide advice and assistance to forest owners and potential forest owners.

14.7 ACTIVITIES OF THE FORESTRY COMMISSION, TASMANIA: SUMMARY

Particulars	*1983–84*	*1984–85*	*1985–86*
Area prepared for regen. burning (ha)	6 502	4 048	5 839
Seedlings produced ('000)	3 530	3 912	4 327
Plantations — established during year (ha)	1 421	1 688	1 261
Firebreaks — constructed (km)	78	107	242
Roads — constructed (km)	112	115	86
— improved (km)	10	117	108

Both these organisations were officially established in September 1978. The private forest estate is a major part of the State's forest resource.

The Commission also has a responsibility for controlling forest fires on or near State forests. In the 1984–85 season, the Commission fought 71 fires that burnt over 2 000 hectares.

In Tasmania the CSIRO Division of Forest Research is engaged in three main projects; the mathematical modelling of forests and of tree growth, the genetic resources and physiology of commercial species, and forest diseases.

Mathematical models aim at improving knowledge of competition between trees and of yields obtainable from high quality eucalypt regrowth forest. Specific attention has been directed to the ecology of the gum-topped stringybark, an important production species, in its competition with rainforest species in the absence of fire, and problems associated with achieving efficient regeneration.

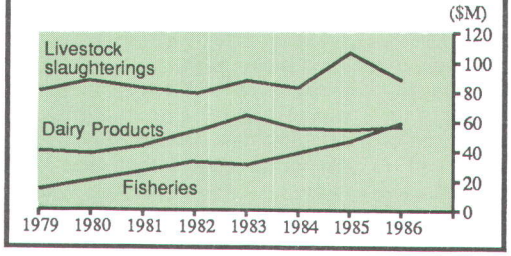
Genetic improvement of plantation conifers and eucalypts, both through seed improvement and vegetative propagation, is under investigation. More general genetic studies are of the reproductive biology and pollination mechanisms of native tree species. Growth rates and environmental factors affecting the functioning of plantation trees are also under detailed investigation.

Forest diseases, their carriers and the effect of disease on tree growth are being researched. Specific diseases include a premature needle-loss syndrome affecting exotic pines in Tasmania and dieback in several native forest species.

14.2 COMMERCIAL FISHING

Commercial fishing in Tasmania has seen dramatic growth in both scale and diversity in recent decades. While consolidation will be necessary to maintain production levels and enable further growth, fisheries value of production now ranks with other significant primary industry sectors.

VALUES OF FISHERIES, DAIRYING AND LIVESTOCK SLAUGHTERING, TASMANIA



The gross value of fisheries production for 1985–86 was $56.6 million and resulted from the landings of 30 857 tonnes of fish and shellfish. Both landings and value set new records. The catch was 10 000 tonnes up on the previous year and value of the landings exceeded the previous record set in 1984–85 by $11 million. The improvement in price was very largely influenced by the depreciating value of the Australian dollar.

The industry has, with its increased scale and importance, experienced concurrent changes in management techniques and in research and development activities. While many of these changes have been necessary administrative procedures, local innovation has seen original and potentially valuable developments. For example, culture of oyster spat is already a rewarding industry within a few years of its development and other fisheries techniques, such as Atlantic salmon farming, have been adapted to local conditions.

14.2.1 Fishing: An Historical Necessity

The Convict Era 1803–1850

In early Van Dieman's Land supplies from the outside world were obtainable only sporadically, leading to shortages sometimes verging on starvation. Attentions turned to natural resources and other means of self sufficiency. Although kangaroos, emus and waterfowl were more reliable, fishing was undertaken from the earliest days. Early in 1806 a huge haul of mackerel caught by seine net opposite Knopwood's cottage in Battery Point, Hobart, was parcelled out amongst the convicts, providing an important food supplement to the fledgling settlement then on the brink of starvation.

Whale and seal fisheries had predated settlement in Van Dieman's Land. As a risky but potentially highly profitable industry, much exploration and support to the fledgling settlements were undertaken, a pattern that was to continue throughout the nineteenth century. Oil production, and sealskin and whale by-product exports were important industries based around the young colony, but they ultimately led to the decimation of target species.

1850–1900

Whaling declined through the second half of the nineteenth century. The more easily caught southern right whales had become rare in local water and offshore hunting of sperm whales was both a more substantial undertaking and less economically rewarding. The market for whale oil also declined as mineral oils superseded the more expensive natural product.

Victoria's development during this period provided a ready market for Tasmanian exports. In the 1870s King Barracouta were caught by trolling lures, but the fisheries suffered an apparently natural decline over a decade or so. Crayfish or rock-lobsters provided a steady income to fishermen. Native mud oysters, previously an important food of the Tasmanian Aborigines, were dredged commercially from southern bays and estuaries. For some decades, hundreds of thousands were sold in Hobart but after the 1880s the supply declined markedly despite the occasional discovery of new beds. Scale fish such as flathead, cod and flounder were also supplied to the local market.

Twentieth Century Fisheries to 1960

Scallop dredging commenced in Tasmania in 1905 in the Derwent Estuary. Until 1925, public acceptance of scallops was low but sufficient to deplete local beds to the extent that restrictive legislation was required. This in turn resulted in transfer of the fishery to sheltered beds in the D'Entrecasteaux Channel. For two decades production levels increased, peaking in 1947 when 51 boats dredged 23 million scallops to yield 400 tonnes of scallop meat. A subsequent decline resulted in further exploration and the discovery of new east coast beds which allowed production levels to be maintained. In 1957 scallops were discovered in commercial quantities in mainland Australia for the first time, (near Bundaberg in Queensland), breaking Tasmania's near monopoly on the Sydney and Melbourne markets.

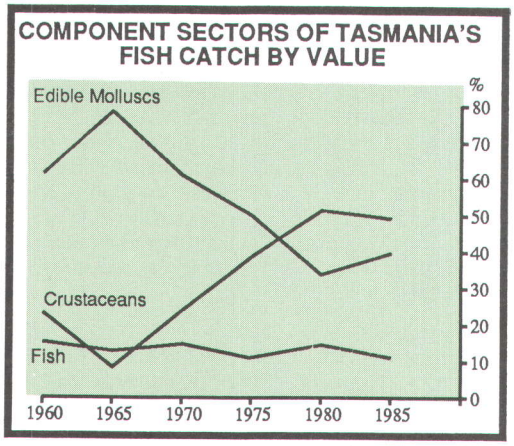
Scale fish harvested during this period comprised mainly Australian salmon, barracouta or snoek, rock cod, flathead, trumpeter, mullet, trevally and sea garfish. The method of catching Australian salmon involved watching from headlands for surfacing schools followed by pursuit and netting. Inshore set-net and beach-seine techniques were targetted at trumpeter, mullet, trevally and garfish on a smaller scale than the salmon fishery. Flathead, rock cod and barracouta or snoek caught by trolling were also significant contributors to domestic markets.

A significant shark fishery was re-established in Tasmania at the beginning of the Second World War, primarily as a substitute source of vitamin A, which could be obtained from shark liver, but also for the flesh in the fresh fish trade. Shark has consistently been a preferred rock lobster bait as the flesh is firm, a factor which has also led to its popularity as a food, especially on Victorian markets.

Crayfish or southern rock lobster has long been a popular, though relatively expensive, seafood. The catching technique, using a baited funnel trap or craypot, has changed little, but is

both laborious and subject to the vagaries of weather conditions. As an export commodity, rock lobster developed during the 1930s from being a significant but small export-earner, to a dominant proportion of all interstate and overseas seafood exports. With World War Two this trend was reversed as more basic food-fish were substituted for the luxury product. This latter trend continued into the late 1950s when the value of crayfish exported from Tasmania again exceeded that of scale fish.

Technological innovation has significantly influenced the various local fisheries, especially from the 1930s onward. Most developments have originated elsewhere and been adapted to local conditions. Mechanisation, for example, was introduced into northern hemisphere fisheries early in the twentieth century with steam powered vessels and large scale purse-seine netting, but in Tasmania mechanisation was primarily through the gradual introduction of diesel engines from the 1930s onwards. Echo location equipment for depth sounding was developed in the 1930s and extended in function into electronic fish detection during World War Two. This technology was economically marginal in local fisheries on introduction, but subsequently has been adopted almost universally after solid-state electronics and mass-produced equipment became available. Artificial fibres applied to nets, ropes and other gear revolutionised such equipment from the 1950s. Unlike previous new technologies mentioned, such materials tended to be price competitive from their introduction and applicable to almost any scale of operation. Power-assisted equipment such as winches for hauling of craypots and nets supplemented the introduction of powered craft.



14.2.2 The Modern Industry, 1960–1986

Through the 1950s the value of fisheries production was relatively static but from then has shown significant increases in real terms. Three industry sectors are the primary contributors. The fish sector includes the shark fishery and, until the recent advent of fish farms, has been based on natural populations. Rock lobster is the dominant crustacean product in Tasmania, with prawns and freshwater crayfish produced on a smaller scale. Edible molluscs include the traditional mud and cultivated rock oysters, scallops and the more recently marketed abalone and farmed mussels. Although abalone production commenced in Tasmania, and indeed Australia, only in the mid-1960s, it has come to dominate, in terms of value, the edible mollusc sector.

Scale Fish and Shark

Of the three principal fishery sectors, fish represents a relatively consistent 10–15 per cent of overall value of production, at least over the last 25 years. In a climate of rising production values generally, growth in fish values has therefore also occurred. Rather than representing a general increase across all components, deep-sea fish, inland and estuarine farmed fish, and seaweed have contributed most of the overall increase in total value of production.

Deep-sea fisheries involve logistic difficulties and scales of operation far exceeding those of more traditional local fisheries. Against this, trawling may produce large single catches and the species caught often attract high unit values. Species such as orange roughy, deep-sea trevalla, gemfish and blue grenadier have all gained acceptance on local, interstate and overseas export markets, especially since the dietary benefits are also highly regarded. Amongst the logistic problems is the uncertain extent of such fisheries. Overseas, long-term fishing patterns and related research have allowed scientific management controls to be applied. Although such studies are already underway in Tasmania it may be a decade or more until the viability of deep trawls, especially those exploiting highly localised concentrations of species such as orange roughy, are established.

Despite extensive and successful trialling of deep-trawl techniques undertaken by the Tasmanian Department of Sea Fisheries (TDSF), local fishing enterprises have been slow to move into this potentially lucrative fishery. By 1986 only one Tasmanian-based enterprise had entered the offshore trawl fishery. Landings of deep-trawl species in Tasmania in 1985–86 increased by 25 per cent to reach 545 tonnes worth more than $865 000.

Trevalla, a species harvested chiefly by drop-lining, requires less elaborate equipment than trawlers, but because suitable grounds may be up to 250 km offshore, boats of around 30 m and more in length are required to withstand the adverse weather often experienced. In 1985–86 the trevalla catch fell to 125 tonnes, slightly above the 1983–84 level but well below that of 1984–85 during which lucrative new grounds were first exploited.

14.8 TASMANIAN FISH CATCH, 1985–86

Species	*Landed weight*	*Value ($)*
Flounder	3 268	9 228
Cod	3 519	4 030
Blue Grenadier	185 677	215 299
Tuna	12 879	10 379
Snoek	56 168	29 634
Gemfish	25 288	43 927
Mullet	6 366	5 371
Trevally	65 982	65 322
Warehou	17 370	36 853
Mackerel	22 328 216	1 535 134
Deep Sea Trevalla	124 653	281 401
Spotted Trevalla	3 777	10 453
Salmon	884 693	510 287
Boarfish	775	1 061
Morwong	27 005	31 493
Whiting	32 471	21 001
Trumpeter	12 717	38 577
Latchet	1 856	2 449
Flathead	22 956	18 994
Shark	424 745	1 051 013
Skate	579	585
Leather Jacket	1 222	1 636
Garfish	34 941	72 542
Orange Roughy	303 305	566 751
Dory	40 344	50 692
Ling	16 288	31 837
Rock Lobster	1 456 014	16 233 304
Crab	872	3 009
Octopus	9 761	12 857
Scallop	483 596	3 326 318
Abalone	3 558 028	30 800 998
Squid	3 583	5 566
Periwinkle/Sea Urchins	6 201	4 961
Oysters	659 041	1 550 853
Mussels	36 850	65 746
Other	6 014	3 829
Total	30 857 020	56 653 387

Source: Department of Sea Fisheries.

Following a substantial increase in landings in 1984–85, recorded landings of shark fell in 1985–86 to 425 tonnes. This decline may be in part due to a resumption of scallop fishing, but may also reflect the introduction of an interim management regime for shark fishing in Commonwealth waters. This plan encouraged fishermen to report catches of shark in the previous year in order to qualify for licences.

Shark catches have proved the most reliable sector within the period of review. Longlining, where many baited hooks are attached close to a long, anchored rope, is the principal catching method. Shark fishing is traditionally an important adjunct to rock lobster fishing in Tasmania, both as a seasonal alternative fishery and as a bait source. Tasmanian fishermen have therefore opposed single-fishery licensing controls mooted for Commonwealth waters.

Jack-mackerel has long been recognised as probably the most abundant commercial fish in the Tasmanian region. Huge shoals form off eastern Tasmania each autumn and early winter. Its strongly flavoured, dark oily flesh is, however, not popular in Australia but is ideal for large-scale canning for export.

Harvesting of the species on a significant scale was attempted from 1979 to 1982 but the enterprise subsequently collapsed due to insufficient capitalisation and initial processing difficulties. In 1984 another attempt to utlilise jack-mackerel was initiated and since then jack-mackerel has dominated the tonnage of all fish landed in Tasmania. Using the large-scale purse seining method and high technology aerial surveillance equipment, catches of 20 and 40 thousand tonnes per annum have been reported for 1985–86 and 1986–87.

The fish is processed into fish meal, much of which is fed to farmed salmon and trout. Fish meal is also used as a stock feed additive and as a fertiliser. This process has initially been from a floating factory but further onshore infrastructure is under construction. Despite the enormous catch tonnages by local standards, the low unit-price led to a significant, but not dominant, increment in the total value of the 1985–86 fish catch in Tasmania.

Fish farming has a long and important history in countries such as China, but is relatively new to Tasmania. The basic principle is that the vulnerable early developmental stages of the fish are raised under carefully controlled conditions. Young fish are then placed in cages, often in sheltered open waters, and fed until required for harvesting or breeding. Another form of fish farming is the capture of migratory elvers as they move up rivers and their cultivation into marketable eels.

Trout and Atlantic salmon, both members of the salmonid family, are the principal farmed species in Tasmania. Although salmonid hatcheries have existed in Tasmania since 1864, their initial purpose was the naturalisation of exotic salmonids to supplement the native freshwater fish. Trout are principally fresh water fish although adult fish will tolerate brackish condi-

tions; Atlantic salmon spend their adult stages in the sea. Both thrive in cold, clean water, an abundant resource in Tasmania. Maintenance of a viable and protected environment is a necessity and involves considerable infrastructure. Both trout and salmon are esteemed table fish, with the latter attracting premium prices.

The marketing of farmed trout has become economically significant and considerable investment has been applied to Atlantic salmon farms. From 1983–84 to 1985–86 the value of adult trout production trebled to $1.6 million, while the value of ova more than doubled to reach $0.4 million. 1985–86 also saw the first Atlantic salmon marketed, reported to be 52 tonnes valued at $1.1 million retail.

The intensive nature of fish farms has a number of potentially adverse effects and is susceptible to catastrophe. The structural intrusion of large buoyed cages into sheltered bays has been a point of objection in accessible, scenic areas. Effluent, both directly from cages and from processing works, may also be a problem. From the producer's point of view, the close confinement of the fish tends to increase the risk of disease and parasitism. Predation from seals has proved an early difficulty in estuarine fish farms. Licences to shoot otherwise protected seal species have been issued. In the longer term, strengthening of cages may be a more satisfactory solution since even an occasional seal breaching a cage may result in major economic loss.

Initial marketing of salmonids on a significant scale has seen ready acceptance of the products, expecially in Australian restaurants. Initial hopes of major overseas exports have been dampened by extremely rapid production growth in the northern hemisphere, particularly Norway and elsewhere in Scandinavia and in Canada. New Zealand also produces farmed salmonids but otherwise Tasmania seems assured of further growth in this relatively new fishery.

Crustaceans

Rock lobster or crayfish is by far the most commercially important Tasmanian crustacean. Its habitat, rocky seafloors, is not as extensive as in South or Western Australia where large offshore reef systems exist. It nonetheless remains an important fishery, contributing to both local and export markets. After 19 years of annual increases in catches a downturn of 24 per cent from the previous year was experienced in 1985–86. The value of the 1985–86 catch declined only marginally, however, as export price levels strengthened. The decline in catch size was attributed to unseasonal catching conditions.

Maintenance of a viable rock-lobster industry is achieved via a restrictive licencing policy, seasonal limits, the mandatory use of escape slots to enable small specimens to escape and rigorously enforced size limits. Research into the seasonal behaviour of rock lobster has enabled the open season to be extended on a regional basis. Concern has been expressed about conservation of the fishery, but the continuing market interest in traded licences and ongoing monitoring of stock are regarded by authorities as at least interim guides to future prospects in the fishery.

Edible Molluscs

Scallops and oysters are the traditional edible molluscs in Tasmania and have recently been supplemented by abalone, squid, octopus and periwinkles. As contributors to the gross value of fisheries production, molluscs have surpassed the fish and crustacean groups since the establishment of the important abalone industry in the late 1960s.

With the signing of an agreement between the Commonwealth and State Governments, Tasmania gained control over almost all of the scallop resources adjacent to the State for the first time during 1985–86. The Government immediately introduced a new management regime which limited the number of vessels licensed to fish and regulated landings by limiting the quantity of scallops which each vessel may carry at any time.

The downturn that occurred for 1984–85 continued, with grounds being closed for much of the year. However, the harvest of previously closed areas in Bass Strait was principally responsible for the fact that landings exceeded those of the previous year. Almost 3 000 tonnes of scallops were caught and sold on a strong market which resulted in the value of the fishery exceeding $3 million, which was more than 50 per cent above the value of the fishery in 1984–85.

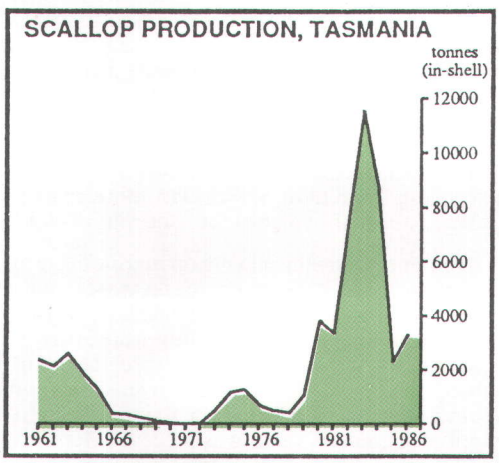
Abalone is a shellfish living on marine algae on rocky seafloors. Its principal markets are in Asia, especially Japan where its appeal as a food commands high prices. Its importance as an export product has risen steeply to the point, where in 1985–86, its value as an overseas export from Tasmania, $30.8 million, exceeded that of wool. This record value was achieved despite a reduction of 10 per cent in the quota for 1986.

Licences issued by the State government are currently limited to 125 with a maximum quota of 28 tonnes each and an annual fee based on catch size. Intense competition has seen licences traded on the open market for more than $500 000. Quotas, introduced in 1985, are seen as an industry control that should enable a sustainable yield while enabling divers flexibility in

planning their work programs and in lowering health risks. Although high licence values are seen as an indication of confidence in the fishery, relatively little is known of its biology. Research has indicated that, at least in Tasmania, removal of mature breeding stock usually results in negligible re-settlement by immigrant stock, and thus potential collapse of the fishery, as has occurred overseas. Experiments have also been conducted with a view to either re-seeding natural habitats or farming abalone from the spawning and larval stages.

Abalone diving is both labour intensive and potentially hazardous. Diving equiment may be as simple as the diver's personal apparatus although more usually a boat and breathing equipment are used. Boats are often fast run-abouts that enable flexibility of dive location and versatile access to rocky coasts. Diving in more remote areas is sometimes facilitated using a larger boat accessed by dinghies. Although abalone are found in shallow sub-tidal seafloors, they extend into depths at which decompression sickness or 'the bends' is an insidious but well recognised hazard. Because the onset of some symptoms may be delayed, diver precautions such as limited depth and duration of dives are important.

Scallops chiefly occur in rich beds at water depths of 10–50 metres. The discovery and exploitation of these beds has always resulted in sporadic marketing of scallops.



In 1985–86 almost 3 000 tonnes of scallops, slightly more than the 1984–85 catch, were caught after waters previously closed were opened to fishing. A strong market saw the value of the 1985–86 catch increase by more than 50 per cent on the previous year.

Oysters have undergone a resurgence in recent years based on introduced cultivated rock oysters rather than the historically important native mud or sand oysters. Oyster farming involves the placement of artificial substrates such as extensive timber racks into shallow protected coastal waters, thus simulating the oysters' normal rocky intertidal shore habitat. Throughout the 1970s, production levels of around 100 tonnes (in-shell) per annum were experienced, increasing throughout the 1980s to 658 tonnes, worth $1.6 million, in 1985–86. Oysters are filter-feeding molluscs that are susceptible to even low-level water contaminants. These may injure the oysters directly or accumulate either biotoxins such as sewage bacteria or some planktonic larvae, or inorganic poisons such as the heavy metals cadmium and mercury. The sheltered waters in which oyster farming occurs must therefore be isolated from industrial and urban runoff.

Squid are free-swimming molluscs represented by a diversity of species, sizes and habitats. Local species having commercial potential are up to 50 cm long and live in the upper layers of coastal waters. Squid are attracted to lights, a behaviour exploited by fishermen. Lures and multi-hooked jigs are then used to capture squid, although daytime purse seine netting has also been attempted. Although an extensive squid resource has been proven in Tasmanian waters, and partially exploited by foreign boats under licence, local exploitation of this valuable resource has as yet been minimal.

14.3 REFERENCES

ABS Publications Produced by the Tasmanian Office:

Sawmilling, Woodchipping, etc. Statistics (8203.6), Quarterly.

Other Publications:

Commonwealth Department of Primary Industry, *A Balance of Values, Background to the 1985 Commonwealth Decision on New Tasmanian Woodchip Licences*, Canberra, 1985.

Department of Sea Fisheries, *Annual Report*, Government Printer, Hobart.

Forestry Commission, Tasmania, *Annual Report*, Government Printer, Hobart.

Tasmanian Woodchip Export Study Group, *Environmental Impact Statement on the Tasmanian Woodchip Industry Beyond 1988*, Hobart 1985.