

## FISHERIES AND WILDLIFE

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### FISHERIES AND WILDLIFE IN VICTORIA

#### **Fisheries and Wildlife Division**

##### *Introduction*

Conservation of Victorian fisheries and wildlife requires the management of widely diverse species and the habitats which support them. With sound management goes the research upon which it is based. Consequently the responsible authority, the Fisheries and Wildlife Division of the Victorian Ministry for Conservation, deploys its resources to priorities prompted by the intrinsic value of the State's fauna and the recreational and commercial needs of the community.

Until the 1940s, fisheries and wildlife activities in Victoria were mainly restricted to limited enforcement programmes and the stocking of streams and lakes with trout. Before Federation, the functions were the responsibility of the Department of Trade and Customs, and after 1901, were transferred to the Department of Public Works. In 1909, the activities were taken over by the Department of Agriculture, and in 1913, a Fisheries and Game Branch was formed, under the control of the Chief Secretary. In 1933, a 50 cent trout licence was introduced and by 1940 the branch had an annual budget of \$21,000.

The development of a research and management organisation began in the 1940s. By 1952, the Branch had a staff of 40 with a budget of \$82,000: \$5,000 of which was spent on research. Research into ducks resulted in a \$2 game licence being introduced in 1959.

In January 1973, the Ministry for Conservation was formed, and the functions and the Branch became the Fisheries and Wildlife Division in the new Ministry. By then there were 250 persons on the staff and half of the \$1.8m budget was spent on research.

Conservation research had become a most important function in 1973 and there were 18 scientific officers and 45 support staff in the Marine Pollution Section of the new Division. Early in 1978, the Marine Pollution Section was transferred to the Ministry proper to join a newly formed Marine Studies Group coinciding with its translocation to a site at Queenscliff. In 1979, the responsibility for the biological component of marine fisheries research was transferred to the Marine Studies Group. The Commercial Fisheries Section as a result of this re-organisation has been able to expand and consolidate its management obligations to the fishing industry.

By June 1980, the Division's permanent and exempt establishment numbered 305 and was supported by a budget of \$5m. Research also covered a variety of other fields including commercial marine fishing, inland stream and lake stocking, fauna control, and environmental studies.

The fauna of Victoria, the fishes, mammals, and birds, can be placed in two categories. The first category comprises the species which have special value as forming part of the unique ecosystem of the continent and which, because of environmental changes taking place about them, require skilled management of their populations if they are to be maintained. The majority of native freshwater fishes, many of the marsupials, and some birds fall into this category. The second category contains those which because of their abundance and capacity for survival are available for food or provide recreation for the

community. Examples are large numbers of fish species, mostly sea water types, ducks, quail, and deer.

### *Wildlife*

Historically most wildlife management and research in Victoria has been orientated towards game or pest control. Work of this nature is continuing, but in recent years the need to undertake other kinds of research has been recognised. This additional requirement may be related to a general community interest in conservation.

At one time, control of wild animal pests in agriculture and forestry was approached on the basis of exploring techniques of getting rid of as many of the offenders as quickly and cheaply as possible. This older approach has gradually evolved into what might be called the specialised management of wildlife which requires the basic understanding of the ecology of each species, its relationship with other species, and the use of that knowledge as a basis for control. The control of rabbits by myxomatosis is an example. Studies of native fauna in Australian universities have influenced this change in approach. The knowledge gained has been of great potential value to the wildlife manager.

Research undertaken by the Fisheries and Wildlife Division is now orientated towards providing a better basis for management decisions. Programmes are now increasingly directed towards conservation, although the long established monitoring of duck and seal populations will continue, even if on a smaller scale.

Research, which has long-term objectives, or objectives which are difficult to define, does not easily attract the necessary funds. This type of research contrasts with that in which short-term objectives have popular appeal. Recently, government support has been made available for a number of such longer-term projects which would not have previously attracted financial assistance.

### *Current wildlife research studies*

A survey and classification of wet-lands of Victoria is now in progress. Although this work has strong links with game management objectives, its significance is much greater because for the first time inland waters are being related to wildlife survival. From the results it will be possible to draw up a list of priorities for the conservation of wet-lands on the basis of their values to many species beyond those of game interest.

Similarly, a general survey of the distribution and abundance of vertebrate animals in Victoria is a long-term undertaking which will provide the basic information against which future changes in the status of wildlife can be measured. In the course of this general survey several species have been recognised which require urgent investigation because of their limited distribution or their declining status. In some cases the Division is studying these species or encouraging other research organisations to do so. Current research of this kind deals with the mountain pygmy possum, long-billed corella, leadbeaters possum, helmeted honeyeater, and the ground parrot. The peregrine falcon is also being studied because it is declining throughout the world, apparently as a result of the effects of pesticides which reduce the strength of its egg-shell.

Another study concerns native rodents which seem to be especially responsive to the effects of fire on heath lands. Studies on the characteristics and acceptability of artificial nest boxes and dens may help to off-set some of the effects of commercial forestry on native animals.

### *Reserves management*

Fish and wildlife require a congenial environment if they are to thrive or in some cases even survive. Therefore, to offset ever increasing demands made by an expanding human population, areas reserved for the natural propagation and maintenance of fauna and fish must be adequate. In order to be self sufficient, the Division's policy is directed to making reserves large and free from undesirable influences exerted on them by surrounding land which may be used for agricultural or other purposes. A continuing land purchase programme is in operation.

Reserves which have been proclaimed or purchased now number 124 and cover about 105,000 hectares. The Division is continuing to establish and consolidate the habitat of wildlife throughout Victoria by purchasing land and recommending additions to the

existing sanctuaries to form wildlife management co-operative areas. The Land Conservation Council has made final recommendations involving an additional 35 reserves of about 7,000 hectares in total area.

Wildlife habitat on reserves and other Crown land is either restored to the natural regime or maintained by the replanting of vegetation, the installation of water controlled structures, and sometimes, by releasing wildlife formerly present in the area. Koalas are regularly captured and re-located and emus and magpie geese have been re-introduced into areas around Puckapunyal and Sale Common, respectively. Rare species are propagated at the Division's Wildlife Research Station near Lara.

Further reference: *Mud Islands, Victorian Year Book 1980, pp. 330-1*

#### *Liaison with service groups*

In the wildlife area the Division has continued to assist various government and private organisations. Groups such as the Bird Observers Club, the Victorian Field and Game Association, and the Victorian National Parks Association have benefited from Divisional participation. Among the government authorities are the State Rivers and Water Supply Commission, the Forests Commission, the National Parks Service, the Town and Country Planning Board, the Country Roads Board, and the State Electricity Commission.

#### *Monitoring habitat*

Visual observation often indicates that physical interference has unfavourably affected the indigenous animal inhabitants. However, at other times the interference may be much less apparent and sometimes insidious.

Nevertheless, the cost of monitoring and thereby forecasting threats to all of the State's habitats is excessive, and too often, therefore, corrective action can only be taken after an adverse effect on land or water is observed in the animal or fish populations. This is usually reflected in an increase in the number of fish or animal deaths or by an easily detectable decline in numbers.

Lake Burrumbete near Ballarat was the subject of investigation after excessive input of pollutants into the lake was first indicated by the production of dense masses of algae which caused the death of fish and livestock. Similar signs in the Gippsland Lakes have led to a comprehensive study of the lake system. This will incorporate investigations of water movement, inventories of aquatic and land species, and basic measurements of productivity, all of which are essential to the development of effective conservation policies and management techniques.

#### *Fisheries management*

The practical management of fisheries in Victoria is complex in the freshwater environment. Water, because of its susceptibility to physical and chemical influence, plays an important role in determining the range and density of fish populations. In the sea the primary concern is the continued adequate yield of fish for either the fishing industry and recreation, or both.

Victoria's commercial fisheries provide about 16,000 tonnes of fish worth around \$18m annually and thus considerable research and management is directed towards this industry. The Division is also aware of the importance of the recreational demands on the estuarine and inshore fish stocks. Some of the salt water species which are of primary importance to the fresh fish market (which constitutes about 17 per cent of the total Victorian catch) are also sought by anglers. Snapper, whiting, and flounder are examples, and in the case of snapper it is estimated that the quantity of the commercial catch is matched by that taken by amateur fishermen.

Unlike the recreational fishermen of the inland lakes and streams, those anglers who fish the bays and coastal waters of Victoria do not contribute to the special research and development trust funds partly financed from licence fees. Because of this, money set aside for marine fisheries investigations is mainly channelled towards commercial fisheries, which do make a contribution through substantial licence payments.

The unrestricted exploitation of natural resources often results in irreparable damage being done to the resource itself with the consequential unfavourable effects ultimately being passed on to the exploiter and the community at large. Many of the State's fisheries are, therefore, subject to controls which limit exploitation by way of imposing ceilings on

either the number of fishermen or boats licenced and the quantity of fishing gear which may be used. The licensing provisions of the Fisheries Act are particularly important in the process of management of the fisheries. They establish the Director's prerogative, on the recommendation of the Commercial Fisheries Licensing Panel and the Fisheries Management Committee, to grant or refuse an application for a licence. Such decisions are within the context of "having regard to the welfare of the fishery concerned as well as the persons engaged in the industry".

Thus having the authority to refuse applications has provided the Director with a mechanism for limiting the number of fishermen and boats in certain fisheries. During 1980, limited-entry status was afforded the non-culture segment of the eel fishery and certain of the bay and inlet scale fish fisheries. Previously licence limitation had been applied to the scallop, abalone, rock lobster, and some bay and inlet fisheries.

As well as maintaining research and monitoring studies on the State's established fisheries, the Division has directed attention to the development of hitherto unexploited resources. Intermittently since 1975-76 the Division has operated its research vessel in the west of the State with the aim of establishing an off-shore trawl fishery adjacent to Portland. This work initially involved surveys of the seabed to determine suitable conditions for trawling and later led to the vessel being engaged, early in 1977, in simulated commercial trawling along with the vessel chartered by the Commonwealth Government. The results obtained were sufficiently encouraging to attract commercial interests and participation in this fishery is now accelerating. The trawling ground so far discovered is in waters of from 300 to 400 metres deep and covers almost 300 square nautical miles. The fishery is based at Portland and is expected to support about 10 trawlers.

#### *Fisheries extension work*

Traditionally, extension or advisory work has been one of the duties of the Fisheries and Wildlife Officers of the Field Operations Section. To a large extent this function remains, particularly in relation to advice on fisheries laws, licensing, and general information about the activities of the Division.

Recently the Division's extension capability was strengthened by the employment of two extension officers specifically appointed to assist with the management and development of commercial fisheries. Their role is to communicate to fishermen results of research conducted both by the Division and other agencies, and assist fishermen in understanding the principles involved in fisheries management and the development of new techniques for improving the efficiency and scope of the State's fisheries and fishermen. Conversely, the liaison officers provide an effective means by which the views of fishermen are conveyed to the Division. Apart from making individual contacts with men in the industry, the liaison officers organise seminars at fishing ports which discuss papers presented by both government and industry. They have also been responsible for the planning and publication of a quarterly *Fisheries Newsletter* which is designed to keep the industry advised of research development and management activities relevant to commercial fisheries in Victoria.

#### *Statistics*

The following table shows certain particulars about the fishing industry in Victoria for the years 1974-75 to 1978-79:

VICTORIA — FISHERIES: MEN, BOATS, AND EQUIPMENT				
Year	Registered crew members	Boats registered		Value of nets and other equipment
		Number	Value	
				\$'000
1974-75	1,533	772	9,469	1,633
1975-76	1,427	752	10,865	2,308
1976-77	1,565	825	11,919	2,532
1977-78	1,720 (a)	891	n.a.	n.a.
1978-79	1,891 (a)	980	n.a.	n.a.

(a) Estimated.

NOTE. The statistics in this table are collected by the Fisheries and Wildlife Division and processed by the Australian Bureau of Statistics.

The following table shows the catch of fish, crustaceans, and molluscs for the years 1974-75 to 1978-79 landed at Victorian ports irrespective of the waters in which they were caught.

VICTORIA—FISHERIES: QUANTITY OF CATCH (a)  
(tonnes)

Year	Fish (b)	Crustaceans	Molluscs	Total
1974-75	9,445	387	9,084	18,916
1975-76	7,314	531	6,919	14,764
1976-77	10,089	316	5,868	16,273
1977-78	9,209	345	6,831	16,385
1978-79	9,303	279	7,816	17,398

(a) All figures relate to live weight.

(b) Includes freshwater.

NOTE. The statistics in this table are collected by the Fisheries and Wildlife Division and processed by the Australian Bureau of Statistics.

#### *Trust fund projects*

Trust funds now have a special relevance to the maintenance and development of inland fisheries. A recent amendment to the Fisheries Act made provision for anglers' fees to be paid into the Fisheries Research Fund. A significant increase in these fees has now permitted an annual commitment averaging \$200,000 for projects which would otherwise have not been undertaken.

#### *Murray Cod—Lake Charlegrark*

One of the projects made possible by the establishment of a trust fund into which the revenue from fishing licences is paid, is the Warm Water Fisheries Pilot Project at Lake Charlegrark in the far west of Victoria. This project which was officially opened in 1976 was established to develop intensive culture techniques for Murray cod, taking advantage of a naturally reproducing population of cod in the adjacent lake.

A promising breeding technique using artificial spawning sites has been developed which eliminates the high stress and mortality rates associated with earlier hormonal stimulation techniques. A feeding regime for young cod has also been developed at the pilot project based on initial feeding with brine shrimp, before weaning the fish onto liver which is followed by a liver-pellet mixture; this eliminates the need for extensive plankton ponds to produce food. These two innovations have removed what were the major barriers to intensively producing cod to a size where they could be safely stocked in waters containing populations of predatory fish such as redfin.

The Division is now in the process of selecting a site for a major warm water fisheries research station and hatchery where further development of culture techniques will eventually make possible the large scale production of Murray cod, trout cod, golden perch, silver perch, Macquarie perch, and catfish for release into their former habitats.

#### *Trout surveys*

In response to anglers' concern at the apparent general decline in the State's trout fishery, a Trout Management Group was formed late in 1977 to survey and report on the status of trout populations in all major waters. In its first three years of operation, the Group has travelled 90,000 kilometres and carried out over 190 individual surveys of 138 rivers, lakes, and reservoirs. During this period, survey results have shown that there has been a general recovery of trout populations in north eastern streams but there are still problems in parts of the Ovens River system. Even in this area, there have been substantial increases in the numbers and weight of fish present. The west of the State was in considerably better condition with many of the lakes and reservoirs carrying very good trout populations.

The main problem area is Gippsland where surveys have shown that most rivers were carrying very low numbers of trout even after constant stocking for extended periods. Further stocking of these waters is difficult to justify on these grounds alone. Many of these waters also carry the relatively rare and scientifically important species, the

Australian grayling; and pending the results of further studies on this fish, trout releases into the area have been suspended.

### *Carp*

In Victoria over the past decade, the introduced species known locally as European carp (*Cyprinus carpio*) has received considerable attention due to its alleged ability to alter the habitats of native fish and wildlife. Although carp are considered a pest, their presence and abundance in Victoria has prompted the development of a commercial fishery.

Since 1972, commercial fishermen have harvested over 1,700 tonnes of the species, making the carp fishery an important commercial fishery in Victoria. Commercial catches of carp by electro-fishermen rose from 50 tonnes in 1972-73 to a maximum of 543 tonnes in 1976-77. Since that time catches have declined almost to the level of the 1972-73 catch. Whether this reflects a condition of overfishing in those areas in which carp are harvested or whether the abundance of carp is declining is not clear at this time.

### *Carp control*

In 1976, the Victorian Government approved a three year study aimed at assessing the impact of carp on fish and waterfowl. The study was planned after consultation with other fishery authorities from adjacent States. Staff have been appointed and the initial phase of the investigation was implemented late in 1979. Should this assessment programme show that carp are damaging the aquatic environment, remedial action will be considered. With this prospect in mind, a series of studies to explore alternatives to netting and poisoning as means for controlling carp have begun.

One method by which control over carp populations might be achieved is through the introduction of a virus (*Rhabdovirus carpio*) specific to carp. These tests are being conducted in co-operation with the Fish Diseases Laboratory, Weymouth, England. These tests have shown that carp is susceptible to the virus. Native fishes are also being exposed with the virus to ensure that they will not be damaged should this method of control be attempted.

A second possible control technique under investigation is the introduction of a genetic defect into resident populations of carp. This defect, in theory, might then be transmitted throughout the population, and affect the survival of offspring.

### *Environmental studies*

Developmental projects involving the State's watersheds may produce marked alterations in stream flows which are of some consequence to the aquatic environment and the conservation and management of both amateur and commercial fisheries.

One example is the construction of major dams on the head-waters of streams which enter the Gippsland Lakes system. This activity may well result in a change to the existing salinity of the lakes and the fish populations supported by them. Before management procedures aimed at counteracting these effects can be implemented, base line data on the tolerance of individual fish species to changes in temperature, salinity, acidity, alkalinity, and dissolved oxygen are required. At the moment little is known of the influence or effect of these factors on individual fish or on fish populations.

As a first step towards understanding the behaviour of native fishes under different conditions, on-site studies of estuarine, warm and cold water inland species have begun using a Divisional hut on the Nicholson River in Gippsland which was equipped with constant temperature aquaria for carrying out a number of basic fish tolerance experiments. Initial observations related to the behaviour of fish under conditions of crowding and their acceptance of food of various types. The second stage of the experiment will be directed towards determining the tolerance of the chosen species to changes in salinity, dissolved oxygen, acidity, and alkalinity.

Suitable subjects for fish tolerance studies will be chosen from a number of species undergoing examination which includes bream, estuary perch, mullet, flathead, flounder, whiting, luderick, garfish, and anchovy.

### *Field operations*

The day to day responsibility of maintaining contact with the outdoor public and of enforcing the provisions of the Fisheries and Wildlife Acts rests with the 52 Fisheries and

Wildlife Officers of the Field Operations Section. Some of these officers, 28 in all, are stationed in strategic rural and coastal areas according to the Fisheries and Wildlife demands of the particular regions of the State. There are, for instance, 16 Fisheries and Wildlife officers who occupy offices in fishing ports and direct the major part of their activities towards the commercial fisheries.

In the inland where wildlife conservation and recreational fishing takes pre-eminence, the twelve districts into which the State is divided, each with its own resident officer, vary considerably in area and nature of responsibility. In 1979, a regionalisation scheme was brought in. In the six regions the regional officer co-ordinates the activities of the district officers in his region.

The Victorian Fisheries and Wildlife officers also have the delegated responsibility of enforcing Federal fisheries laws and regulations which apply to the adjacent off-shore seas. With the proclamation of the 200 mile declared fishing zone, this aspect of their work will increase and be assisted by a fast 17 metre sea-going patrol boat.

#### *Angling information*

One of the questions of great importance to anglers is where and when to catch fish. In many cases information regarding particular species and size is also sought. To answer these questions, the Division has published an *Angling Guide* which lists over 500 inland angling waters in Victoria and describes the type of water, the surrounding country, and any special problems or fishing restrictions likely to be encountered. The Guide lists the fish type, their abundance and expected size, and in some cases it also gives advice on the best times to go fishing and the methods most likely to succeed.

**Further references:** *Water pollution, Victorian Year Book, 1978, pp. 347-8; Chinook salmon, 1980, pp. 335-6*

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