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FISHERIES AND WILDLIFE

Fisheries and Wildlife Division

Introduction

The Fisheries and Wildlife Division's development from the Fisheries and Game Branch of the Chief Secretary's Department in 1913 to a Division of the Ministry for Conservation in 1973 has been reflected in Victoria's Fisheries Acts and, especially, the Game Acts. The latter, which were in force during the first half of this century, were designed to protect imported game species, whereas the two new Acts promulgated in 1975 reflect the Division's responsibility for conservation of the native fauna and its environment.

The Division's scientists and support staff are widely experienced in conservation research and management, and the sections work together to provide the multi-disciplinary facilities for ecological studies. Indeed, the Division's activities should be viewed in relation to their bearing on conservation, other government agencies, and the community in general.

The following are some of the main activities carried out by the sections. The fish biologists in the Marine Fisheries Section have investigated the mercury content of edible shark and the concentration of heavy metals in edible molluscs—a community health problem for the Victorian Department of Health, and a water quality problem for the Environmental Studies Section and the Marine Pollution Studies Group.

The Marine Pollution Studies Group is undertaking environmental studies of Port Phillip Bay, Western Port, and the Gippsland Lakes—three areas of major interest to every section within the Division, to most agencies within the Ministry, and to many other government agencies in Victoria.

The Environmental Studies Section's study of the effects of pesticides in thinning the eggshells of certain species of birds is also of interest to the Wildlife Research and the Wildlife Management Sections and to conservationists concerned about the distribution of pesticides in the environment.

The timing of the open season for duck shooting in relation to the breeding and moulting habits of waterbirds—an important consideration in the conservation of Victoria's waterbirds—has been investigated by the Wildlife Research and the Wildlife Management Sections.

Another of the Wildlife Management Section's projects has been to assess the relative importance of individual wetlands as breeding and feeding grounds for waterbirds—a study of value not only to the Wildlife Research Section but also to the State Rivers and Water Supply Commission. The Wildlife Research Section has also surveyed the flora and fauna of certain areas so that their value for the conservation of Victoria's wildlife can be estimated. These were joint projects with the Land Conservation Council.

Investigations of the Dartmouth Dam's effect on the fish and wildlife of that area have been carried out by the Freshwater Fisheries and the Wildlife Research

Sections—another investigation of interest to the State Rivers and Water Supply Commission.

Environmental Studies Section

In the early 1960s the Division was already engaged in research into the effects of man's activities on the environment of Victoria's fauna. It took part in the Committee of Inquiry into the effects of pesticides which was set up in 1964, at the conclusion of which the Environmental Studies Section was formally established. The Section undertook research into the direct and indirect effects of industrial and agricultural pollutants on aquatic and terrestrial environments. As particular problems were identified, the Division's responsibilities were defined and the first steps were taken to establish research groups for the Port Phillip Bay Environmental Study and the Western Port Bay Environmental Study.

Concurrently, the Section became increasingly involved in the multi-disciplinary approach to environmental problems that affected not only fish and wildlife, but also the public use of resources. At present the Section is investigating the potential problems arising from the presence of significant quantities of heavy metals such as mercury, cadmium, and zinc in marine and freshwater fish, molluscs, and crustaceans.

Other projects on which the Section is engaged include the use of molluscs as indicators of aquatic contamination by heavy metals and pesticides; the causes of eutrophication of Lake Burrumbeet; the investigation of eggshell thinning in certain bird species; and the monitoring of pesticides in areas of intensive farming. Several of these projects are being conducted in collaboration with other government agencies.

Marine Fisheries Section

Landings of rock lobster, abalone, and scallops accounted for 55 per cent by value of Victoria's total fish landings in 1973–74. Almost all the abalone, 80 per cent of the scallops, and 60 per cent of the rock lobsters are exported. Most of the fish consumed by Victorians are the school shark and gummy shark, which together constitute about 80 per cent of retail sales.

During early 1972 mercury concentrations exceeding the limit considered safe for human consumption (0.5 parts per million) were found in some sharks. This discovery led to a ban on the landing and possession of school sharks exceeding a total length of 104 cm and the requirement that school shark fillets entering Victoria should be certified to contain less than 0.5 ppm mercury. Implementation of these regulations resulted in a 37 per cent decrease in Victoria's shark landings and the almost complete cessation of shark fishing by South Australian and Tasmanian fishermen. However, the consumption of shark has continued to be popular and substantially increased prices are offered for the fish. Anticipating the reduced catches and incomes of shark fishermen after the ban on landing large school sharks, the Australian and Victorian Governments together allocated some $240,000 to re-equip fishermen's boats and to hire fishermen to develop and demonstrate alternative methods of fishing so that shark fishermen could be relocated in other fisheries. This rehabilitation programme has, so far, involved chartering fourteen boats and has provided encouragement for the establishment of an otter trawl fishery and a drop-line fishery for trevally off Victoria.

The discovery of high mercury levels in sharks drew attention to the possibility of this and other heavy metals for which permissible limits are prescribed being found in other Victorian fish. To support investigations being conducted jointly by the Health Department and the Fisheries and Wildlife Division, the Australian Government provided a grant of about $100,000 from its Fishing Industry Research Trust Account. The investigation is designed to determine the levels of twelve heavy metals in Victorian fish and to investigate the biological pathways leading to high mercury levels in shark. Although incomplete, these studies have shown that high heavy metal levels are confined to large individuals of relatively

few species and therefore do not appear to constitute a general human health hazard in the consumption of fish. However, it has been necessary to prohibit the taking of mussels in Corio Bay because of unacceptably high levels of cadmium, presumably resulting from industrial discharge from the Geelong region.

During the early 1970s there was concern that the shark stocks of south-eastern Australia might be over exploited in view of the relatively low reproductive capacity of the sharks. Each female usually produces fewer than thirty offspring once every two or three years. The South-Eastern Fisheries Committee, comprising all the directors of government fisheries agencies within the region and responsible for co-ordinating research and management, endorsed the need for an examination of the fishery, and subsequently about $230,000 from the Fishing Industry Research Trust Account was allocated to such a study. The aims of the shark investigation are to examine the biology of school and gummy sharks and to recommend any necessary changes in the management of the shark fishery. The discovery of mercury in shark and particularly the ban on landing large school shark have diverted fishermen to gummy shark, which now forms the bulk of the shark landings. The investigation is due to be completed during 1977.

Certain fisheries confined predominantly to Victorian waters are managed by the State authorities, usually independently of the South-Eastern Fisheries Committee. The most important of these fisheries are the coastal abalone fishery and the Port Phillip Bay scallop fishery. The number of fishermen operating in these fisheries is restricted by Victoria's policy of accepting responsibility for the "welfare of the industry and its fishermen". These restrictions were introduced in 1968 when it was considered that neither fishery could sustain the number of fishermen operating at that time, and since then those retiring from the fisheries have not in the main been replaced. In the abalone fishery this has led to the fishermen being progressively fewer and older. Consideration is now being given to determining the optimum number that should be engaged in this fishery, and the strategy for maintaining that number of fishermen. The number of fishermen engaged in Victoria's scallop fishery and rock lobster fishery, another restricted-licence fishery, has remained reasonably stable in recent years.

The other important fisheries for which Victoria is solely responsible are the commercial and recreational fisheries of the bays and estuaries. Apart from scallops in Port Phillip Bay, most of the landings are fin-fish such as flathead, snapper, King George whiting, black bream, yellow-eye mullet, and flounder.

Marine Pollution Studies Group

The Marine Pollution Studies Group, established in 1968, is currently involved in the biological aspects of three major marine environmental studies.

The Port Phillip Bay Environmental Study began in 1968 as a joint project with the Melbourne and Metropolitan Board of Works. It had three broad objectives in the first phase, namely, to :

(1) develop quantitative descriptions of the physical, chemical, and biological characteristics of Port Phillip Bay during various seasons and under various conditions of tide, wind, and freshwater inflow ;

(2) correlate these physical, chemical, and biological data with the characteristics of discharges entering the Bay, with particular reference to those from areas under the jurisdiction of the Melbourne and Metropolitan Board of Works, and to establish, as far as possible, the effects of these discharges on the characteristics and beneficial uses of the Bay ; and

(3) determine if there are specific physical, chemical, or biological characteristics which may be used in a continuing programme to evaluate quantitative future changes in the Bay.

The report on the first phase of the Study was published in 1973, and work has progressed on finalising the biological studies of the first phase since that date.

In 1972, work was initiated on the Western Port Bay Environmental Study, and the Group again provided much of the marine operations support, and carried out research projects on various aspects of the marine ecology of the system. Important studies of the distribution of marine plants and animals were undertaken in conjunction with active laboratory-based investigation programmes.

A third study currently under way is the Heated Effluent Study, established jointly by the Division and the State Electricity Commission to investigate the effects of discharges of heated cooling-water from power stations and other major industrial installations. The study was developed in Hobsons Bay in order to evaluate selected field techniques and, in conjunction with laboratory studies, to provide information on the post-commissioning performance of the proposed Newport D power station.

A fourth study, at present in the planning stages, is to investigate the environmental effects of proposed developments in the catchment of the Gippsland Lakes.

The annual costs involved in operating the three existing studies is about $500,000. A team of eighteen research scientists and 53 support staff is employed full-time on the biological aspects of these marine environmental studies.

Freshwater Fisheries Section

This Section is responsible for all aspects of Victoria's inland fisheries; for assessing the impact of development proposals on inland fisheries; and for liaison between the Division and the angling public.

The survival of some of Victoria's native fish is being threatened by man's activities. Blackfish are still widespread but large specimens are now uncommon. Macquarie perch and trout cod are endangered species, and the Division is taking measures to conserve self-sustaining populations of these fish, and to investigate their basic biology. It is hoped that information necessary for artificial propagation of Macquarie perch and trout cod will be gathered, and plans for developing a hatchery are being prepared. Grayling, once common in Victoria's coastal streams, are now almost extinct. Little is known of their life history, although it seems certain that they migrate seasonally from the coast to the headwaters. Construction of dams on coastal streams is seen as a major threat to their continued existence, and the Division has therefore requested substantial financial support from the Government for an urgent and detailed investigation.

Freshwater eels are the basis of a viable and expanding commercial fishery, particularly in Western District lakes. At present the industry relies mainly on capture of wild eels, but several commercial operators are investigating the possibility of intensive farming of eels in closed ponds. The Section has started a research programme to study eel migration and other aspects of the eel's biology.

In the past, studies of fish diseases and parasites were restricted to outbreaks at the Division's Snobs Creek Station and at other fish-raising establishments. Little is known of the diseases and the parasites of natural fish populations, and a State-wide survey is planned. Tissue culture facilities for identification of virus diseases are also planned for the Snobs Creek Station. The Section has commenced studies of the physiology of native fishes and a survey of heavy metal contamination of freshwater fishes in representative waters throughout Victoria.

A pilot warm-water fisheries project for native fish was begun at Lake Charlegrark in the Wimmera in early 1975, and the data obtained will be used to develop detailed plans for a full-scale Inland Fisheries Station.

Most of the trout raised each year at the Division's Snobs Creek Hatchery are liberated into Victoria's lakes, as the streams are generally well-stocked by natural spawning. Streams in East Gippsland have not and will not be stocked with trout in the foreseeable future, as the Division is concerned about the possible effects of trout on native fishes in the area. Common (European) carp continue to spread through inland waters, both by natural means and by deliberate or accidental introductions by man. The Section is carefully monitoring their spread and documenting all available information on the observed effects of carp on the aquatic environment. The Division is encouraging commercial exploitation of carp and has issued several permits for the use of electrofishing gear by commercial fishermen.

The Section plans to develop premier fishing waters close to larger population centres, and to investigate the reasons for fish mortalities in certain lakes. It provides expert guidance and advice to persons or organisations interested in aquaculture development, and is responsible for the inspection of consignments of aquarium fish arriving at Melbourne Airport from overseas, to preclude as far as possible the possibility of diseased fish or prohibited species entering Victoria.

The Section is also involved in predicting the effect of certain proposals, primarily dam construction and river improvements, on fish and their habitat, and, in general, endeavours to maintain effective liaison between the Division and the angling community, particularly in relation to current research and management activities, changes in legislation or policy, and the consideration of anglers' views in all policy-making procedures.

Commercial fisheries statistics

The statistics of production shown in the following tables are in terms of live weight for fish, crustaceans, and molluscs. In interpreting fisheries statistics, allowance should be made for the incomplete coverage. Returns are collected from licensed professional fishermen only, and as a result the published totals fall short of total fish production to the extent of the catch by amateur fishermen, the commercial catch by persons not licensed as professional fishermen, and unrecorded catch by professional fishermen.

The following table shows certain particulars about the fishing industry in Victoria for the years 1969–70 to 1973–74:

VICTORIA—FISHERIES : MEN, BOATS, AND EQUIPMENT

Year	Registered crew members	Boats registered		Value of nets and other equipment
		Number	Value	
			$'000	$'000
1969–70	1,429	795	4,966	944
1970–71	1,504	815	5,862	1,174
1971–72	1,534	808	6,237	1,329
1972–73	1,573	806	7,090	1,390
1973–74	1,530	781	8,805	1,597

The following table shows the catch of fish, crustaceans, and molluscs for the years 1969–70 to 1973–74 landed at Victorian ports irrespective of the waters in which they were caught. Also included are fish, etc., landed by Victorian fishermen in South Australia.

VICTORIA—FISHERIES : QUANTITY AND GROSS VALUE OF CATCH

Year	Fish (a)		Crustaceans		Molluscs		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	tonnes	$'000	tonnes	$'000	tonnes	$'000	tonnes	$'000
1969–70	15,983	3,396	812	1,502	4,409	1,081	21,204	5,979
1970–71	14,510	3,277	780	1,719	7,007	2,314	22,297	7,310
1971–72	15,893	3,335	799	1,970	10,416	4,201	27,108	9,506
1972–73	10,768	3,306	859	2,093	14,380	6,072	26,007	11,471
1973–74	10,138	5,010	684	1,869	10,188	4,186	21,010	11,065

(a) Includes freshwater.

Wildlife Research Section

Early studies of Victoria's wildlife were usually directed towards one particular species of animal, but as the understanding of ecology has developed, the emphasis has changed towards gaining a better understanding of whole communities of plants and animals and the ways in which the different species interact. This will help to manage the habitat where it becomes necessary to encourage desirable species or suppress those which may be pests.

For some 30 years until the mid-1960s almost nothing was seen of the potoroo, one of the small rat-kangaroos in Victoria, which was thought to be in danger of extinction. A study was commenced in 1967 to map the past and present distribution of potoroos and define their habitat preferences. Some animals were kept in captivity so that reproductive biology and behaviour and the development of the young could be studied. It is still not clear how many distinct species occur in Victoria but there are several isolated colonies, and cross-breeding experiments may help to unravel their relationships.

For many years professional fishermen have regarded the thriving colonies of the Australian fur seal in coastal waters as a serious threat to their industry. The biology of this species has been studied with the aim of developing a conservation policy which would allow a measure of control that did not endanger the survival of these colonies. The study is therefore primarily concerned with the factors which regulate the size of the population, its movements, and its food resources.

When the Land Conservation Council was established in 1970 it soon became apparent that there was insufficient knowledge of the distribution of wildlife in Victoria which would enable the Council to select land for the future needs of fauna conservation. A wildlife survey team comprising four scientists and four technical support staff was established to classify habitat on the basis of its botanical composition and to survey the associated populations of mammals, birds, reptiles, and amphibians. It will be many years before there are adequate distribution maps for every one of Victoria's 700 species of vertebrate animals, let alone the thousands of invertebrates, and at this stage the best way to attempt to conserve wildlife is to try to reserve adequate areas representing the major habitat types.

Even as a result of natural processes, wildlife habitat can change quite radically with time so that what might be a good wildlife reserve now may not be suitable for the same species in 30 or 40 years time. There is a great urgency to learn more about these processes of change so that techniques can be developed for maintaining suitable living space for some animals by deliberate manipulation of the vegetation if necessary.

Far more rapid changes often occur as a result of the activities of man : the building of reservoirs, the clearing of forests, the draining of swamps, and so on. In 1975 a small research team was formed to document some of the implications for wildlife of such undertakings by making inventories so that comparative assessments may be made in later years. The nature of this work makes it slow, arduous, and expensive and only a selected few of the more significant developments can be studied in this way.

A significant event in 1974 was the formation of the Australian Council of Nature Conservation Ministers. It supersedes the former Fauna Authorities Conference which attempted to develop a co-operative and unified technical approach to wildlife questions common to different parts of Australia, but lacked the political prerogatives to ratify work on behalf of the Victorian and Australian Governments. The Ministers now call on the experience of their officers to develop formal policies and co-operative projects between governments on such subjects as conservation of waterfowl, control of illegal commerce in fauna, and management of kangaroos.

Wildlife Management Section

In 1975 a new Wildlife Act, which introduced a new era in legislation for wildlife conservation in Victoria, was passed by the Victorian Parliament. All vertebrate animals (except fish and humans), and thus not only birds and mammals but all types of reptiles now come within the scope of the legislation, which is sufficiently flexible to allow appropriate regulations to be promulgated quickly to adapt to any new situations. The research and management roles of the Division are now recognised by legislation and this also reflects the contemporary approach to wildlife conservation.

The Division restructured its wildlife operations in mid-1975 by dividing responsibilty for wildlife between the Wildlife Research Section and Wildlife Management Section. All wildlife research, including game research, is now carried out by the one group, while all technical and administrative management functions are carried out by the management team.

The functions of the Wildlife Management Section include conservation of wildlife throughout Victoria as well as responsibility for State Wildlife Reserves and other habitat management projects, often in collaboration with other government and private organisations. It also acts as consultants to government and private bodies on wildlife habitat and other wildlife management matters; applies game management principles to the proper use of recognised game birds and mammals in Victoria; assesses the possible detrimental effects of wildlife on agriculture, forestry, etc., and recommends measures to alleviate any damage; and co-ordinates the issue of all permits and licences to collect, trap, or otherwise utilise wildlife in Victoria. The Section also organises the activities of private zoos, wildlife parks, game bird farms, and deer farms, all of which are developing rapidly in Victoria.

The Division is continuing to establish and consolidate State Wildlife Reserves throughout Victoria, both by purchasing freehold land and by reserving public land on the recommendation of the Land Conservation Council. The 41 Reserves now in existence have a total area of 56,700 hectares, and the Land Conservation Council has recommended that another 16 Reserves, having a total area of nearly 12,000 hectares, be established.

As one of its major responsibilities, the Division is continually reviewing the appropriateness of open seasons for game species. In collaboration with New South Wales, South Australia, the Australian Capital Territory, and the Commonwealth Scientific and Industrial Research Organization, the timing of the open season for wild duck in south-eastern Australia has been investigated since 1972. As a result the opening of the 1975 season was delayed until mid-March, and the new situation is now being examined in the same way.

In 1975 the Division completed an inventory of wetlands in the Kerang region of Victoria, in order to provide data on which water authorities can base decisions on the disposal of saline drainage water from irrigated farmlands while avoiding undue detrimental effects on waterfowl habitat. A similar project, related to proposed drainage works, has also been completed for the Corop Lakes area.

The Division formed the Deer Advisory Council of Victoria in 1973. Deer hunters, deer conservation groups, deer farmers, deer fanciers, and appropriate

government agencies are represented on the Council which has greatly assisted the Division in its consideration of legislative and management aspects of deer conservation. The Division, largely in conjunction with other groups associated with the Deer Advisory Council of Victoria, is becoming increasingly involved in deer management.

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