

A REVIEW OF PAST AND PRESENT INSHORE GILL NETTING IN TASMANIA WITH PARTICULAR REFERENCE TO THE BASTARD TRUMPETER *LATRIDOPSIS FORSTERI* CASTELNAU

by D. N. Harries and R. L. Croome

HARRIES, D.N. & CROOME, R.L. 1989 (31 x.r A review of past and present inshore gill netting in Tasmania with particular reference to the Bastard trumpeter *Latridopsis forsteri* Castelnau. Pap. Proc. R. Soc. Tasm. 123: 97-110. ISSN 0080-4703. <https://doi.org/10.26749/rstpp.123.97> Centre for Environmental Studies, Department of Geography and Environmental Studies, University of Tasmania, G.P.O. 252C, Hobart, Australia 7001.

The evolution of regulatory control of inshore gill netting in Tasmania is documented and compared with that of the mainland Australian States; the historical catch records of one fish in particular, the bastard trumpeter (*Latridopsis forsteri* Castelnau), are used to discuss the appropriateness of past and present management of the Tasmanian inshore scale fishery.

The need for regulation of inshore gill netting first became apparent in the late 1870's; limited control measures were introduced in Tasmania in 1890, primarily to protect juvenile and adult breeding stocks of salmonids. The regulations have been altered little since that time and, at present, lag behind those of the mainland States. Declines in the recorded commercial catch of the bastard trumpeter occurred in the late 1870's and early 1880's and again between 1910 and 1918; more recently a general decline has been shown from the mid-1950's to the present. These declines are discussed in relation to inshore gill netting effort and regulatory control of gill netting in Tasmania, and to the known biology of this species.

Key Words: gill netting, trumpeter, fishery regulation, Tasmania,

INTRODUCTION

A gill net is a curtain of mesh material, weighted at the bottom and attached to floats at the top, and set in a straight line or curve to snare fish which swim into it. Such nets, known colloquially as "graballs", were introduced into Tasmania soon after European settlement in 1803, and gill netting remained the predominant method by which scale fish were taken in Tasmania for over a century. Although it is still commonly practised, little has been written on the subject of inshore gill netting in Tasmania. A netting survey of the Derwent estuary (Dix 1974) and a more recent study of the comparative short-term effects of varied netting pressures on reef fish communities (Schaap and Green 1988) have been the only reports on gill netting published by Tasmanian fisheries authorities to date. The question of the long-term impact of this fishing method on the fish populations concerned remains largely unexamined.

The bastard trumpeter is of particular importance in any study of gill netting in Tasmanian waters, as this species is reputed to be the prime target of Tasmanian non-commercial gill netters (Edgar *et*

al. 1982) and is most frequently recorded as captured (although not in the greatest quantities) in the gill nets of commercial fishermen (Tasmania, Parliament 1982). Furthermore, a recent report on the biology of the bastard trumpeter (Harries & Lake 1985) found the entire inshore population of this species to be immature. The possible biological and commercial implications of basing a fishery on a purely juvenile stock are sufficiently serious to warrant further investigation.

The present study traces the evolution of gill netting regulation in Tasmania and compares it with that in other Australian States. Information on the past and present Tasmanian catch of bastard trumpeter is then examined, in order to determine whether there is any evidence of a long-term decline in the catch and, if so, whether this may be attributed to the effects of gill netting.

THE EVOLUTION OF INSHORE GILL NETTING REGULATION IN TASMANIA

Scale fishing in the Australian colonies focussed almost exclusively on inshore bays and estuaries

until well into the 20th century (Stead 1910, Pownall 1979, Lenanton 1979, Winstanley 1985). The early Tasmanian inshore scale fishery, however, was overshadowed in importance by the more lucrative fishing industries of sealing (Murray 1927, Vivian 1983) and whaling (Crowther 1920, Murray 1927, Nicol 1986); also, after the mid-19th century, by oyster dredging (Sumner 1972), crayfishing (Winstanley 1973) and, more importantly, the incipient inland fishing industry (Tasmania, Parliament 1860, 1889a; Allport 1870). The latter, particularly, dominated the attention of the authorities, and a body, the "Salmon Commissioners", was set up in October 1861 to preside over attempts to establish an inland fishing industry based on exotic salmon. Six years later, Tasmania became the first community in the Southern Hemisphere to establish a freshwater fishery based on an introduced species (Tasmania, Parliament 1889).

The early Tasmanian inshore scale fishery operated within the umbra of these more valued industries and received little attention from the colonial authorities; indeed, apart from an Act introduced in 1870 to prohibit the sale or purchase of flounder under 9 in. (230 mm) in length (34 Vict. No. 24), it operated without regulation for the greater part of the 19th century. The consequences of this lack of control became apparent in the late 1870's, when concern over declining catches of many of the colony's commercially important marine fishes culminated in the establishment of a Royal Commission into Tasmanian Fisheries in 1881.

The timing of this Royal Commission was also stimulated by events occurring in the other Australian colonies. Although Victoria and New South Wales had passed their first Fisheries Acts in 1863 and 1865 respectively, no other Australian colony had moved to introduce similar legislation prior to the 1880's. Further declines in fish catches from the estuarine and inshore waters of New South Wales led the Government of that colony to hold a Royal Commission into the matter in 1880 and, subsequently, to introduce a second and more encompassing Fisheries Act in 1881. The enactment of this legislation appears to have been the cue for the more peripheral Australian colonies to introduce the rudiments of regulations for governing their own fisheries, and, by 1889, all the Australian colonies had introduced fisheries-related legislation.

The Report of the Royal Commission into the Fisheries of Tasmania (Tasmania, Parliament 1882) attributed the marked decline in catches to

uncontrolled inshore netting activity and advised (p. xiii) that

"the necessity for more effective protection to indigenous fishes is most apparent in reference to flounders, mullet, bastard trumpeter, and perch because these fish are destroyed in such large numbers in an immature state."

This report proposed the adoption of a number of mechanisms utilised in the extant Victorian and New South Wales fisheries regulations, viz. the reservation of nursery grounds "wherein the seine and other objectionable nets shall be absolutely prohibited" (p. xiv); the outlawing of the practice of drawing seine nets ashore before they were emptied and sorted; the temporary closures of exhausted grounds; a total prohibition of fixed nets across river mouths or channels and the introduction of a regulation limiting the minimum mesh size of graballs to 4 in. (100 mm). The Royal Commissioners acknowledged, however, that the paucity of information on the breeding habits and nursery grounds of many of the colony's marine fishes militated against the introduction of specific protective measures for these; furthermore, they were of the opinion that breeding stocks of "such fish as the silver bastard, trumpeter, and perch" were naturally protected in deeper and more remote waters.

The report concluded its recommendations with a call for the creation of a single Board responsible for both the inland and the sea fisheries of the colony, and for the appointment of a skilled inspector to carry out the Regulations as fixed by that Board. Eager to have at their disposal a skilled adviser with European experience, the Salmon Commissioners quickly endorsed the latter of these recommendations and prevailed on the Chief Secretary of the Colony to invite its long-time adviser on salmon cultivation, Sir Thomas Brady, Chief Inspector of Irish Fisheries, to select a suitable person. On the recommendation of Professor Huxley of the Royal Society in London, an experienced biologist, Mr W. Saville-Kent, was offered the position.

Saville-Kent arrived in Hobart from London on 18 July 1884, and his reports to Parliament over the following years (Tasmania, Parliament 1884, 1885, 1887) give testimony to the energy and enthusiasm with which he launched himself into his new position as Superintendent and Inspector of Fisheries of the colony. After surveying the condition of the colony's once-famous oyster grounds and discovering these to be severely depleted, he initiated a programme of oyster cultivation

involving the construction of artificial oyster beds. He brought with him a view that the study and cultivation of indigenous marine species was of paramount importance, and orchestrated the construction of a marine laboratory and hatchery. He drafted a Bill aimed at regulating the southern rock lobster (*Jasus novaehollandiae* Holthius) fishery, which was passed by Parliament in 1885 (49° Vict. No.27). Nor did he overlook the freshwater fishery, arranging for the cultivation of indigenous freshwater species to augment the established exotic salmon and trout breeding-programme. In short, the scientific study and management of the sea fisheries of Tasmania were lifted out of the doldrums of the past era of neglect and set on a course which threw down the gauntlet to the other Australian colonies.

Saville-Kent's activities, while impressive, were also the cause of considerable perturbation to the members of the Salmon Commissioners (Tasmania, Parliament 1886). His assumed independence from their authority and his concentration on marine and indigenous freshwater species, rather than on the salmon and trout fisheries, were regarded as a perversion of the original intent behind his appointment and a provocative challenge to their previously unquestioned status as the sole fisheries authority in the colony. The Commissioners looked to the Government to rectify what they perceived as a temporary, but grossly annoying situation by clarifying their statutory status and authority. Much to their chagrin, however, the Fisheries Inspection Act (48° Vict. No.23), introduced in October 1884, clearly placed the newly-appointed Superintendent and Inspector of Fisheries under the direct control of the Chief Secretary rather than the Salmon Commissioners. Indignant, they embarked upon a protracted campaign to have the second recommendation of the 1881 Royal Commission adopted and the administration of the inland and sea fisheries of the colony reorganised under a single Board, with Saville-Kent demoted to a position of Inspector under the control of this Board. Capitulating to this pressure, the Government sought a compromise and, in 1887, established a Fisheries Department, consisting of a Fisheries Board (23 appointed members responsible for both the inland and the sea fisheries, with the exception of the oyster fishery) and a Superintendent and Inspector of Fisheries (responsible solely for the oyster fishery).

Saville-Kent remained as Superintendent and Inspector of Fisheries with responsibility for the oyster fishery, but spent only two months of the year in Tasmania carrying out these duties, the

remaining months being employed in the capacity of fisheries adviser to the mainland colonies. The dispute did not end there, however, and became embittered when Sir Thomas Brady, on a visit to Tasmania, elected to enter the fray by submitting to Parliament, at the request of the newly appointed Fisheries Board, a report on the fisheries of Tasmania which was openly critical of the management of the colony's oyster fishery (Tasmania, Parliament 1888/1889a). After an embittered and public exchange of correspondence on the matter, Saville-Kent resigned as Superintendent and Inspector of Fisheries; his laboratory and hatchery were dismantled and research into the colony's sea fisheries extinguished.

One of the first tasks of the newly-created Fisheries Board was to address the pressing question of netting in the Derwent estuary, amidst conflict between anglers and net fishermen and claims by both parties that fish catches in these waters were continuing to fall. A Committee of Inquiry was established in 1888 and called on Sir Thomas Brady to assist. Sir Thomas returned written replies to all of the Committee's set questions and also submitted a report on the fisheries of Tasmania to the Committee (Tasmania, Parliament 1888/1889b) and to Parliament (Tasmania, Parliament 1888/1889c). At the request of the Committee, Sir Thomas drafted a comprehensive Fisheries Bill, amending and consolidating the existing laws. This was presented to Parliament late in 1888 and on 28 October of the following year the *Fisheries Act* 1889 (53° Vict. No.11) became law.

Under the new Act, the short-lived Fisheries Board was replaced by a new authority, the "Commissioners of Fisheries", consisting of 25 honorary members. The Fisheries Regulations gazetted in 1890 introduced minimum sizes at which fish could be captured for a small number of species; in the case of bastard trumpeter this minimum length was set at 12 in. (305 mm). The absence of biological data upon which to select appropriate minimum lengths, other than the general observations published by Johnston (1882, 1890), meant that these sizes were largely subjective.

These regulations also introduced limited control of gill netting activity in Tasmania for the first time. A minimum mesh size of 2.25 in. (58 mm) was set for graballs, although no limits were imposed on the number of nets which could be used and, unlike contemporary regulations introduced by most of the other Australian colonies, there was no requirement for licensing of either commercial or

amateur nets. The regulations did require commercial fishermen to take out annual commercial fishing licenses, but this was rendered ineffectual as no power was vested in the Commissioners of Fisheries to enforce the payment of licence fees. No limits were set on the maximum lengths of gill nets until 1893, when the regulations were amended to limit the length of gill nets used in Tasmanian coastal waters to 80 fathoms (240 yds — 220 m) and the depth to a maximum of 15 ft (4.6 m). Length and depth restrictions on gill nets were subsequently rescinded with the gazettal of the Fisheries Regulations of 1905.

Economic depression had led the Government to withdraw funding for Fisheries in the 1890's and the "Commissioners of Fisheries" thereafter relied solely on licence fees to fund its activities. Thus starved of funds and administered by honorary Commissioners appointed largely on the basis of their interest in freshwater angling, without the time or practical knowledge with which to properly manage the sea fisheries of the State, the industry languished and dissatisfaction grew in the post-federation years. Calls for a divorce of the administration of the inland and sea fisheries (Tasmania, Parliament 1913, 1916/17) eventually forced the Government to introduce the *Fisheries Act* 1925, under which the Sea Fisheries Board, consisting of five appointees and chaired by the Commissioner of Police (*ex officio*), was established. Although Professor T. Flynn, of the University of Tasmania, was appointed as Scientific Adviser to this Board, the Government was criticised by the Secretary of the Royal Society of Tasmania, Mr L. Rodway, for failing to include on the Board any representative with a scientific knowledge of the sea fisheries (Tasmania, Attorney General's Department 1928).

The additions to the fishing regulations which accompanied the administrative changes in this Act were relatively minor: the anomaly which had previously allowed commercial fishermen to avoid paying commercial fishing licence fees was rectified; further closures of rivers and estuaries to netting were introduced, in almost all cases, for the protection of trout stocks; the minimum size at which bastard trumpeter could be taken was increased from 12 to 13 in. (305 to 330 mm), although the reason for this action could not be determined by the present authors. Thirteen years later (1938), the minimum mesh size of graballs was increased from 2.25 to 3 in. (58–76 mm). The change was rendered somewhat technical, however, as these same regulations defined for the first time a "mullet net" with a minimum mesh size of 2 in.

(51 mm). No maximum lengths or depths were prescribed for either graballs or mullet nets at this time.

Accusations of impropriety led, in 1940, to the establishment of an Inquiry into the effects of trawling in the Derwent estuary and the D'Entrecasteaux Channel. Commercial fishermen used the opportunity to vent their grievances concerning what they perceived to be unfair competition from amateur net fishermen (Tasmania, Attorney General's Department 1940). Many commercial fishermen lobbied to have amateur gill netting totally prohibited. However, the Secretary of the Sea Fisheries Board, Edwin Percy Andrewartha, argued against such a prohibition on the grounds that the fish in the sea were the "property of the people" (*ibid.*:147) and that netting by amateur fishermen represented a traditional right. Although recommending that Tasmania follow the example of the mainland States by introducing regulations requiring licensing of both amateur and commercial nets, the report of the Board of Inquiry was never released and its recommendations were never acted upon.

In 1941, the Sea Fisheries Board was abolished and replaced by a Fisheries Division within the Department of Agriculture, administered by a Sea Fisheries Advisory Board, and for the first time the sea fisheries of the State came under full ministerial control. At its inaugural meeting on 25 September of that year, the Board elected to revise the existing regulations (Tasmania, Sea Fisheries Advisory Board 1941). Due to the intervention of World War II, however, membership of the Board lapsed after 1942, and only after reactivation of the Board in 1947 was a revision of the sea fisheries regulations again considered (Tasmania, Sea Fisheries Advisory Board 1947). Under the amended regulations, gazetted in 1950, the minimum size at which bastard trumpeter could be taken was reduced from 13 in. (330 mm) to the pre-1926 limit of 12 in. (305 mm) and the minimum mesh size of gill nets was raised from 3 to 4 in. (76 to 100 mm). An examination of the minutes of the Sea Fisheries Advisory Board meetings held between 1941 and 1950 failed to disclose the reason for these changes. It is likely, however, given the lack of biological research carried out at this time, that the changes were implemented for administrative rather than biological reasons.

Amendments to the regulations during this period coincided with the introduction of new synthetic materials from which nets were constructed. Regulation of gill netting in Victoria, New South

Wales and the Northern Territory also underwent significant change during this period. In 1950, the New South Wales Government placed a total ban on the use of these nets by amateur fishers, introduced further restrictions on the maximum lengths and minimum mesh sizes of commercial gill nets, and significantly increased the area of inshore waters closed to netting. The Northern Territory Administration introduced a total ban on amateur gill netting and a prohibition on commercial gill netting within two nautical miles (3.7 km) of the coast in the early 1950's. The Victorian Government also moved to totally ban amateur gill netting during this period, and by the 1960's gill netting by amateurs remained legal in only three of the Australian States: South Australia, Western Australia, and Tasmania (Queensland had outlawed the use of gill nets by amateurs with the introduction of its first Fisheries Act in 1887).

In Tasmania, regulations pertaining to the use of gill nets for amateur fishing differed from those pertaining to their commercial use for the first time in 1966, when a maximum length for graballs and mullet nets used by amateurs was set at 75 yards (68 m). Under these same regulations, amateurs were also restricted to using a maximum of two graballs at a time. Changes to licensing of the sea fisheries came about with the introduction of the 1968 Fisheries Act; these would have required the licensing of amateur net fishing, had it not been for the action of the Legislative Council, which successfully moved to exempt amateurs from the provisions of the Act. In 1974, a maximum of two mullet nets per amateur fisherman was imposed. In that same year, net specifications were metricated and the maximum length of graballs used by amateurs was further reduced to 50 m. An apparent oversight omitted any limit on the maximum length of mullet nets; this was not rectified until 1984 when a maximum length of 50 m was set for these nets also. Minimum mesh sizes remained almost unchanged for both graballs (100 mm) and mullet nets (60 mm).

Further administrative changes in the sea fisheries were implemented after publication of a Government-commissioned study of the industry (O'Kelly 1976). A Fisheries Development Authority was established in 1977. This Authority, however, survived only nine years and was replaced in February 1985 by a Sea Fisheries Department.

Biological research into the sea fisheries of Tasmania had ended abruptly with the departure of Saville-Kent in 1887. Although successive

scientific advisers had been included on the Sea Fisheries Board since its inception in 1925, these scientists had not been actively engaged in research programmes into sea fisheries. A professional fisherman turned policeman, Mr Tom Challenger, was placed in charge of policing the fisheries regulations in 1916 and continued in this capacity until 1945, when he resigned from the Police Department to take up the position of Fisheries Inspector. He remained as Chief Fisheries Inspector until his resignation in 1950. It was largely to this person that the Sea Fisheries Board, and later the Sea Fisheries Advisory Board, turned when seeking advice on the necessity for changes to the regulations. During the 1940's, scientists from the CSIRO acted as advisers to the Sea Fisheries Advisory Board, but it was not until the appointment of Mr M. Hodgson in 1950 that a marine biologist was engaged by the Sea Fisheries Division to conduct research. This attempt to initiate biological research into the sea fisheries, however, proved to be premature and soon failed, due to the absence of suitable facilities (Tasmania, Sea Fisheries Advisory Board 1958). Not until 1968, some 80 years after the departure of Saville-Kent from Tasmania, were such facilities provided. In that year, construction began on the marine laboratories at Crayfish Point, marking the start of a new era in the management of the sea fisheries of Tasmania in which research would increasingly play a part. For the inshore scale fishery, however, this change had unfortunately arrived too late. Significant developments in the rock lobster (Winstanley 1973), scallop (Perrin & Hay 1987), and abalone (Harrison 1982) industries had eclipsed the inshore scale fishery and ensured that almost no research effort was focussed on it.

Regulations governing the use of graballs and mullet nets have remained almost totally unchanged since first introduced in the 1890's and are today the most lenient in Australia. There are no restrictions limiting the lengths or numbers of nets which commercial fishermen may employ and no requirements for licensing of either amateur or commercial nets. Although netting is prohibited in most coastal lagoons and rivers of the State, only one small coastal aquatic reserve (64 ha. located in the Derwent estuary adjacent to the marine laboratories at Crayfish Point) has been declared in Tasmania to date. Netting in this reserve is allowed during daylight hours.

Past regulatory control of the inshore scale fishery in Tasmania has paralleled most closely that of Western Australia and of South Australia. These three States have shared a history of lenient

legislation pertaining to gill netting and remain the only States in which gill netting by amateurs is not totally prohibited. In both Western Australia and South Australia, however, inshore netting has been a contentious issue and major changes have been implemented in both of these States over the past decade and a half. In South Australia, biological studies and surveys of fishing pressure have led to extensive reviews of netting regulations (Jones 1979, 1981, 1986; MacDonald 1986). Large numbers of coastal areas of that State have now been totally closed to netting, the number of commercial licences has been reduced and the number of amateur licenses frozen. Limits have also been placed on the time for which amateurs may set a net and they are required to remain on site while their net is in the water.

In the case of Western Australia, extensive reviews of controls over inshore netting in recent years (Lenanton 1979, 1984) have not led to the implementation of controls to the same extent, and regulations governing the use of nets for commercial and amateur fishing in that State remain relatively lenient. However, 62 coastal areas have been totally closed to netting to date, including almost all waters within an 80 km radius of the capital city, Perth. The retention of more lenient regulation in many of Western Australia's more peripheral coastal inshore waters has been possible through the extensive nature of the

Western Australian coastline and the large distance of many of the inshore waters from population centres.

With these measures being taken by South Australia and Western Australia, Tasmania now lags behind the other Australian States in the regulation of netting in its inshore waters. Since measures to control gill netting were first introduced in 1890, changes to the regulations have been slow and marginal. Only recently has research into the effect of this minimal regulation of netting on inshore populations of the various fish species been initiated, and the question has yet to be sufficiently addressed. In the following section, catch records of one fish, the bastard trumpeter, are examined in order to obtain some insight into the effect of gill netting on inshore species.

PAST TRENDS IN THE COMMERCIAL CATCH OF BASTARD TRUMPETER

The first records relating to the catch of the bastard trumpeter (*Latridopsis forsteri*) in Tasmanian waters are the anecdotal accounts presented to the first Royal Commission into the Fisheries of Tasmania in 1881 (Tasmania, Parliament 1882). Evidence presented to this inquiry indicates that local fishermen considered unchecked inshore netting to be at the root of observed declines in the annual catches of bastard trumpeter and other inshore fishes.

After the turn of the century, records kept of the numbers of each species of fish sold through the Hobart Fish Market, published in the Annual Reports of the Commissioners of Fisheries, represented the only information to which the authorities could turn to obtain a picture of the trends occurring in the sea fishery. Although aware that these figures were, at best, crude indicators of the true annual catch, the Commissioners considered the records to give "a fair idea of the relative trend of the supply of fish and their wholesale prices" (Tasmania, Parliament 1919/1920).

The numbers of bastard trumpeter recorded as sold through the Hobart Fish Market each year for the period 1910 to 1923 are shown in figure 1. There was a considerable decline in the number sold each year between 1910 and 1918, particularly after 1915, and, although sales improved after 1918, the number sold in the final year of the period (1923) was less than one-third of the number sold in 1910. At first sight, it would appear as if this decline were related in some way to the onset

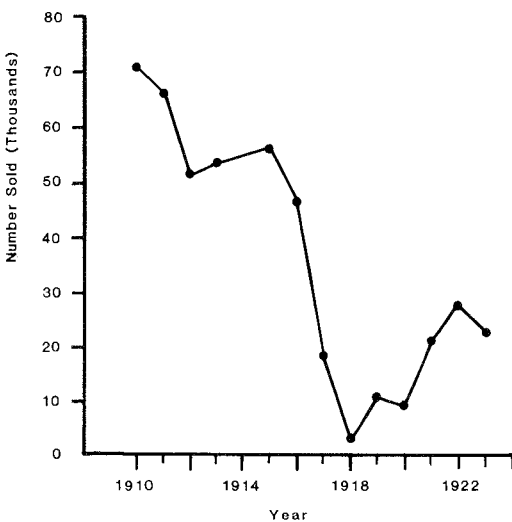


FIG. 1 — Numbers of bastard trumpeter sold through the Hobart Fish Market, 1910–23.

of the Great War (1914–18). The Fisheries Commissioners, however, did not consider the overlap of these two events to be linked and found themselves at a loss to account for the state of affairs (Tasmania, Parliament 1919/1920), particularly as boats of an improved class and in greater numbers were operating (Tasmania, Parliament 1916/1917).

The prices of all fish species escalated dramatically over this period, giving rise to a second Royal Commission into the fisheries of the State (Tasmania, Parliament 1916/1917). The price increases of bastard trumpeter outstripped those of all other fish, suggesting that this species had become comparatively scarce. The downward trend in the annual commercial catch of bastard trumpeter (fig. 1) was paralleled by all other fish species sold through the Hobart Fish Market during this period. Together these facts led the Commissioners to report that “the most prolific grounds have ceased to yield the usual harvest” (Tasmania, Parliament 1920/1921). The decline in the annual commercial catch of bastard trumpeter appears to have resulted from the severe reduction of stocks in estuarine and inshore waters.

From 1924 to 1940, the police were employed to collect statistics of fish catches from local fishermen. Although recognised as subject to many flaws, largely “due to the disinclination on the part of many fishermen to keep accurate records of fish captured for the market” (Tasmania, Sea Fisheries Board 1933), the figures were regarded as “substantially correct” (Tasmania, Attorney General’s Department 1940). The numbers of bastard trumpeter reported as captured during this period generally fluctuated between 60 000 and 80 000 per annum, except in 1932 and 1939 when the reported catches were 173 844 and 169 620 respectively (Tasmania, Sea Fisheries Board 1930, 1933, 1940). Bastard trumpeter comprised, on average, approximately 6% of the total annual catch (by numbers) throughout this period.

Maintenance of a relatively high catch was made possible, according to the secretary of the Sea Fisheries Board, by “intensive fishing of the home (sheltered inshore) and middle (exposed inshore) grounds” (Tasmania, Attorney General’s Department 1940). Gill netting of the inshore waters had extended to the more remote estuaries and bays of the State by 1930, including some fishing on the west and southwestern coasts (Kerr 1985), and it would appear that these virgin grounds sustained the relatively large annual catch of bastard trumpeter during the period.

Fishing activity in Tasmania was disrupted by the

war effort between 1940 and 1944 and publication of annual catch data was limited. After 1944 a more accurate system of fish catch statistics was introduced, whereby fishermen were issued with log books and obliged to keep accurate records of monthly catches for each species. The data collected from these fishing returns provided reasonably accurate estimates of fish catches, although information collected for species such as the bastard trumpeter, which were of lesser commercial importance and were taken as part of a composite catch, is likely to have been less reliable.

Information compiled from these fishing returns was published in the Annual Reports of the Department of Agriculture up to 1961, and thereafter by the Australian Bureau of Statistics (ABS) in the annual publication, the Yearbook of Tasmania. In 1977, the ABS ceased to rely on figures obtained from fishing returns and used instead the weight of each type of fish purchased by fish buyers from fishermen. A weakness of this published information, from the point of view of the present study, was that the annual catch of the bastard trumpeter was usually pooled together with that of the striped trumpeter (*Latris lineata* Bloch & Schneider) and presented as the “trumpeter” catch. However, the Department of Agriculture published the annual catch of the two trumpeter species separately from 1966/67 to 1971/72, and bastard trumpeter constituted the major component of the “trumpeter” catch each year of this period (see fig. 2), confirming the persistent view within the literature that the landed catch of striped trumpeter has been consistently smaller than that of the bastard trumpeter. The “trumpeter” catch for period 1944/45 to 1985/86 is plotted in figure 2.

The reported annual commercial catch of trumpeter has shown a general decline since 1952. The catch was around 45 tonnes per annum from 1944/45 to 1948/49, then fluctuated, with a peak of 52 tonnes in 1952, stabilised at 30–35 tonnes for the period 1954–60, fell to a low of one tonne in 1976/77, and then improved somewhat to around 6–12 tonnes per annum after 1980. The question is whether this general decline in the reported catch was due to a decline in the abundance of the bastard trumpeter or a reduction in gill netting effort, or was a result of commercial fishermen failing to report catches of this fish.

In 1939, there were approximately 190 fishing boats engaged in scale fishing in Tasmania (Tasmania, Attorney General’s Department 1940). In the southern and southeastern regions of the State, only 40 boats were engaged exclusively in scale fishing, ten of them mere dinghies, and

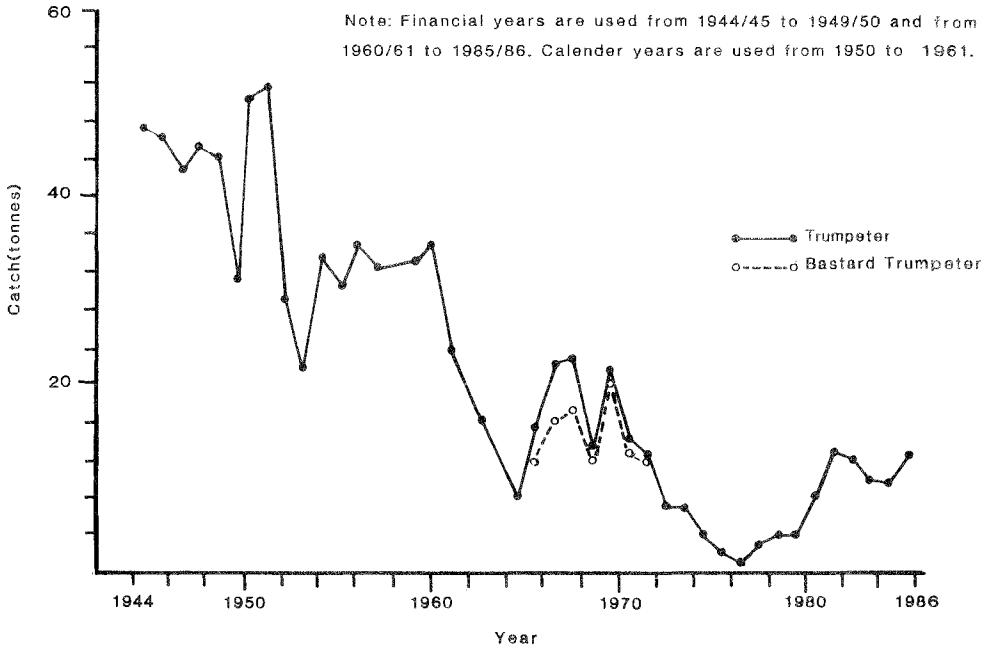


FIG. 2 — Weight of trumpeter landed for sale in Tasmania, 1944–85/86.

documented accounts of sea fishing in Tasmania at that time indicated that only two of these boats worked the southern and southwestern inshore coastal waters (Kerr 1985). Bastard trumpeter made up 9.3% (by numbers) of the total scale fish catch for that year (Tasmania, Sea Fisheries Board 1940). Hence, while inshore gill netting was an important fishing method at the time, it was limited, nevertheless, in terms of the numbers and sizes of the fishing vessels participating and, consequently, the ability of these boats to work the more remote inshore waters.

Fishing activity in Tasmania decreased after 1939, due to the outbreak of war (Tasmania, Parliament 1943/44). In the post-war period the fishing fleet increased manyfold, due to the development of fishing for snoek (*Thyrstites atun* Euphrasen) and shark (*Mustelus antarcticus* Gunther and *Galeorhinus australis* Macleay). Inshore gill netting, however, declined markedly as consumer preference turned to imported frozen fish products (Tasmania, Parliament 1982), and bastard trumpeter comprised less than 0.1% (by weight) of the total reported scale-fish catch for 1948 (Tasmania, Parliament 1949).

The reported annual commercial catch of bastard trumpeter declined after 1952, and by 1976/77 it

had dwindled to a mere one tonne. Despite this, a significant portion of the Tasmanian fishing fleet continued to engage in inshore gill netting at the end of the period. Of the 139 fishing boats under 6 m in length registered in 1979/80 (excluding 96 abalone boats), 116 were recorded as using gill nets (Tasmania, Parliament 1982). Furthermore, crayfish boats also participated in the scale fishery and accounted for a sizeable portion of the total landed catch of scale fish (Smith & Fergusson 1969). The number of commercial fishing boats engaged in inshore gill netting in 1979/80 was therefore comparable to the number operating in the inshore scale fishery in 1939, and likely to be greater than the number in 1948. The modern boats would also have been larger and more capable of fishing the more distant grounds. It would appear from this that inshore gill netting effort in 1979/80 is likely to have been higher than it was in 1948. The general decline in the reported annual catch of the bastard trumpeter since the mid 1940's, therefore, cannot be explained simply by a decline in fishing effort.

Nor is it likely that the decline in the reported commercial catch of the bastard trumpeter since the 1950's can be attributed simply to a lack of reporting of catches of this fish by commercial

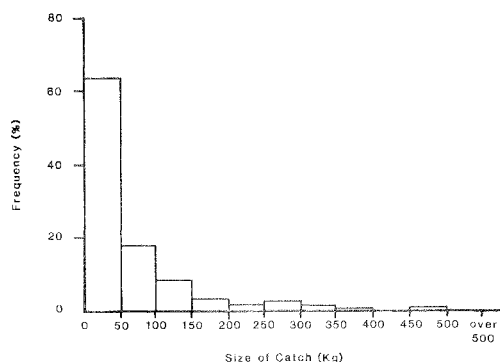


FIG. 3 — Sizes of commercial catches of bastard trumpeter, July 1978 to June 1982.

fishermen. While fishing returns are notoriously inaccurate, methods of collection of this data have improved over time and reported catches are likely to have increasingly rather than decreasingly reflected the true catch. The extent of inaccuracies characteristically contained in fishing returns may be gleaned by comparing annual catch data obtained from these fishing returns with similar data obtained by the ABS from fish sales. A manual compilation from fishing returns of the annual trumpeter catch for the four-year period 1978/79 to 1981/82 was used to make such a comparison and the results indicated that the average annual discrepancy between the two sets of data over this period was 2.6 tonnes, with the greatest discrepancy of 6 tonnes occurring in 1978/79. While it is acknowledged, therefore, that fishing returns are inaccurate, the decline in the reported annual commercial catch of trumpeter since 1952 appears sufficiently marked to have been due to causes other than misreporting of catches alone.

THE PRESENT COMMERCIAL CATCH OF BASTARD TRUMPETER

In order to obtain information on the catch-effort and the distribution of the present commercial catch of the bastard trumpeter in Tasmanian waters, computer printout records compiled from monthly fishing returns kept by the Sea Fisheries Department for the period July 1978 to June 1982 were analysed.

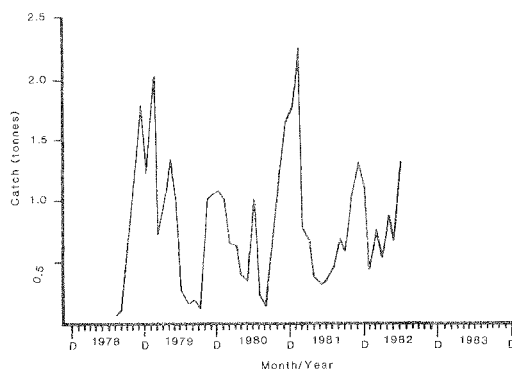


FIG. 4 — Monthly commercial catch of bastard trumpeter, July 1978 to June 1982.

Monthly Catch per Boat

The average size of the monthly catch per boat of bastard trumpeter is small. Figure 3 shows the frequency of the monthly catch-size per boat over the period. Less than 10% of the monthly boat catches were over 150 kg, and more than 60% were under 50 kg.

Seasonality of Catch

The monthly catch of bastard trumpeter is highly seasonal, with a tendency to peak in summer and fall over winter (fig. 4). Two reasons may account for this. Firstly, poor weather leads to a general curtailment of fishing in winter. Secondly, commercial crayfishing is totally closed during the months of September and October, and, as commercial gill netting is frequently carried out in conjunction with crayfishing, gill netting activity may also decline during these months, although some crayfishermen supplement their income during the off-season by turning to other fisheries including the scale fishery (Smith & Ferguson 1969).

Distribution of the Commercial Bastard Trumpeter Catch

For the purposes of fisheries statistics, Tasmanian waters are divided into fishing "blocks" defined by one degree of latitude and one degree of longitude (major bays, estuaries and channels are ascribed separate block numbers).

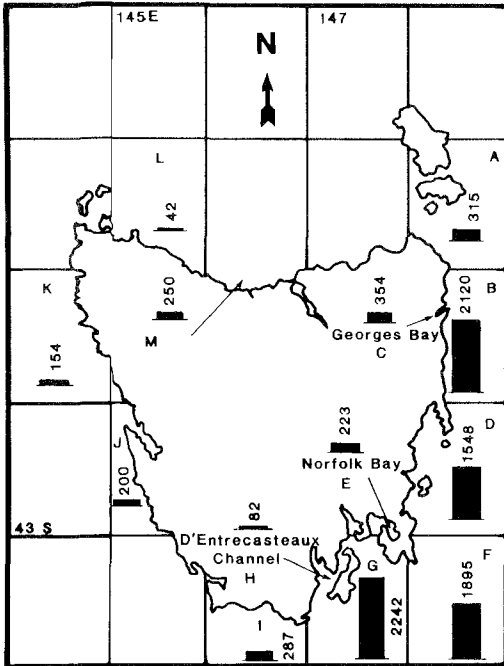


FIG. 5 — Average annual commercial catch (kg) of bastard trumpeter in each fishing block, July 1978 to June 1982.

The greatest part of the bastard trumpeter catch in Tasmania is made in the waters of the eastern and southeastern coast (fig. 5). Catches made along the southern and western coasts are relatively small, possibly due to lower gill netting effort in these waters, resulting from adverse weather conditions. The sea bed adjacent to the more sheltered northern coast is mostly sandy, and catches there are also low.

Catch-Per-Unit-Effort

Commercial gill netting in Tasmania is a secondary fishing method and fishing returns do not distinguish between the effort associated with gill net catch and that associated with the primary catch. With no other information available, the mean monthly catch per boat is used here as a crude measure of catch-per-unit-effort.

The mean monthly catch per boat was calculated for each block over the four-year period (fig. 6). The eastern and southeastern blocks displayed the

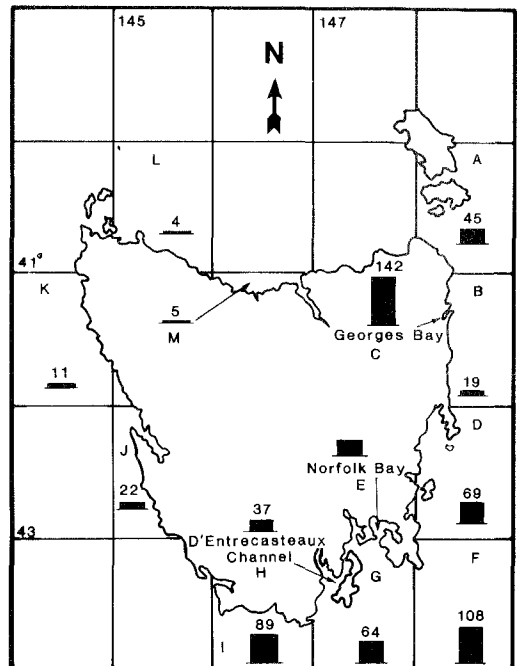


FIG. 6 — Mean catch per boat of bastard trumpeter in each fishing block, July 1978 to June 1982.

highest mean monthly catch per boat, the greatest value being 142 kg in Georges Bay (block C). The northern and western blocks showed a low mean monthly catch per boat, but that of the southern block (I) compared favourably with the mean monthly catch per boat of the southeastern blocks (E, F, G & H) and was higher than the two eastern blocks (B & D). While the average catch from block I was low (287 kg), the sizes of the individual catches recorded in this block were high (up to 89 kg).

NON-COMMERCIAL CATCH OF BASTARD TRUMPETER

Amateur Gill Netting

As amateur net fishing in Tasmania does not require a licence, no direct information exists relating to the extent of amateur gill netting or the size of the annual bastard trumpeter catch taken by this sector. There is, however, indirect information

which suggests that amateur gill netting in Tasmania has increased quite significantly over the past three decades. A study of trends in recreational net fishing in Western Australia between 1950 and 1977 found that the number of persons engaging in this sport increased steadily and significantly over the period, and that the pattern of increased recreational gill netting correlated highly with the increases in average household income (Lenanton 1979).

That present levels of amateur gill netting in Tasmania are high is supported by the results of a 1983 survey of recreational fishing in Tasmania, which found that 6.6% of households (excluding those occupied by commercial fishermen) owned graballs and that an estimated 14 824 persons in Tasmania aged 15 years or more used a graball at least once a year (Australia, ABS 1984). Fifteen per cent of amateurs who owned graballs were found to use them at least once a fortnight. This information, together with the fact that Tasmanian household weekly incomes have risen in a similar manner to those of Western Australia, suggests that amateur gill netting in Tasmania may have increased significantly over the past three decades and that present amateur gill netting effort is of a similar magnitude to that of the commercial sector.

Gill Netting for Crayfish Bait

The range of materials employed by crayfishermen as "crayfish bait" is notoriously wide, and Baker (1982) has claimed that it frequently includes many gill-netted species. The extent to which the more saleable fish captured in gill nets are used for this purpose is not known and is difficult to estimate. It has also been claimed that, since the outlets for small quantities of table fish increased after the mid 1970's, crayfishermen would be more likely to retain the more saleable fish, such as the bastard trumpeter, for sale rather than to use these for craypot bait (Baker 1982).

Smith & Fergusson (1969) reported that commercial crayfishermen rely for the greater part of their bait on frozen fish pieces, and turn to other sources only if the quantity of frozen bait proves inadequate for the fishing trip or if the boat is not equipped with a refrigeration system. These authors suggest that crayfishermen avoid gill netting for bait where possible, as it reduces the time spent crayfishing. However, crayfishermen frequently set one or two nets before dark to collect bait and retrieve these early next morning, that is, the gill netting occurs between pot set and pot collect

phases and does not reduce crayfishing time. The large size of the crayfishery in comparison to the inshore gill net fishery means that if even a small percentage of crayfish bait is obtained from netted scale fish, the total amount of scale fish used in this way could be large in comparison to the scale fish catch landed for sale.

DISCUSSION

Regulatory control of inshore gill netting in Tasmania is the most rudimentary of all the Australian States; regulations established late in the nineteenth century have been retained with few changes. Initially a consequence of the island's relatively small population, which buffered for a time the impact of inshore netting, lenient regulation has remained due to resistance to change in the form of a well-entrenched ethos which holds the fish in the sea to be common property and the use of nets to be a natural right of the common person. Lack of research into the effects of this fishing method has permitted this pervasive view to dictate the terms for management of the State's inshore fishery. The appropriateness of lenient regulation has been challenged in all other States, and it is only in Tasmania, Western Australia and South Australia that gill netting by amateurs is not totally prohibited. However, recent biological studies and assessments of fishing levels have led to significant changes in the regulations of both Western and South Australia and it is now only in Tasmania that the question of the appropriateness of present inshore scale fishery management and netting regulation has not been fully addressed.

Tasmanian catch records of the bastard trumpeter *Latridopsis forsteri* can be used to shed light on the long-term consequences of poorly regulated inshore netting. Reports of declining catches prior to 1882 and records of a decline in the commercial catch of bastard trumpeter between 1910 and 1918 strongly suggest an early depletion of populations of this fish in localised inshore bays and estuaries close to major population centres. High commercial catches of the bastard trumpeter during the 1930's were sustained by the exploitation of virgin inshore fishing grounds further afield. A more general and long-term decline in the reported commercial catch has taken place from the early 1950's to the present.

Recreational gill netting activity appears to have increased significantly since the 1950's; survey results indicate that at present the amateur level is comparable with the commercial. Gill netting has

also been a traditional source of bait for crayfishermen and, although the extent to which crayfishermen use netted fish for "craypot bait" may be declining, the quantity of gill-netted fish captured for this purpose is likely to be high in comparison with the quantity landed for sale.

Total gill netting effort in Tasmanian waters has thus increased significantly since the 1950's and this increase could partially explain the general decline in the commercial catch of bastard trumpeter, as commercial and non-commercial gill netting compete for a limited resource. However, the overall increase does not appear to have been sufficient to explain the *magnitude* of the decline in the commercial catch of bastard trumpeter. The lowest recorded commercial catch of one tonne in 1976/77 represented a decrease to one-fiftieth of the peak catch in 1952 and to one-thirtieth of the catch of 1960/61.

While evidence for the long-term decline in the commercial catch of the bastard trumpeter is founded purely on the premise that fishing returns reflect the true catch, and uncertainty with regard to the reliability of commercial fishing returns clouds the issue and places limits on the conclusions which may be drawn, it must be recognised that no other data currently exist by which to gauge the state of this fishery. Furthermore, the findings of the present study are corroborated by the circumstantial evidence reported by Schaap & Green (1988) of a decreasing relative abundance, total abundance and average size in populations of some reef fish species as gill netting pressure is increased. More importantly, the magnitude of the long-term decline in the commercial catch may be explained by the findings of Harries & Lake (1985), who examined the inshore populations of bastard trumpeter and found them to be comprised entirely of juvenile stock. The original intention of authorities, in Tasmania and elsewhere, in setting minimum lengths at which fish could be taken was to ensure that fish spawned at least once before they were captured (Roughley 1951, Gulland 1974). In more recent times, the purpose of the minimum-length regulation has also been to allow fish to attain maximum yield before being harvested. The present minimum legal length at which bastard trumpeter may be taken, set at 12 in. (305 mm) in 1890 and increased only marginally since then to 330 mm (12.9 in.), achieves neither of these objectives.

The potential dangers of concentrating a fishery solely on juvenile stock are well known (Ingpen 1969, Gulland 1974, Allen 1975, Cushing 1977, Francis 1979, 1983). A number of fisheries

operating in this manner have exhibited declining catches over a long period, and the collapse of the Atlantic herring fishery, attributed to overfishing of the juvenile stocks, is one of the world's classic fishing industry failures (Cushing 1977). It appears that the inshore gill netting of the bastard trumpeter has focussed entirely on the immature stock, and it is highly likely that much of the observed decline in the commercial catch of this fish can be attributed to this fact.

A review of the regulations pertaining to the Tasmanian inshore scale fishery is long overdue. Tasmania lags behind all other States in this regard and should act as soon as is practicable to protect the viability of its inshore fish species. Biological studies and analysis of catch returns have questioned the appropriateness of current regulation as regards the bastard trumpeter, but many other fish are also taken in nets, including labrids (*Pseudolabrus tetricus* Richardson, *P. psittaculus* Richardson, *P. fucicola* Richardson), leatherjackets (*Penicipelta vittiger* Castelnau, *Meuschenia freycineti* Quoy & Gaimard, *M. hippocrepis* Quoy & Gaimard), morwong (*Nemadactylus macropterus* Bloch & Schneider, *Cheilodactylus spectabilis* Hutton), southern rock cod (*Pseudophycis barbata* Gunther), striped trumpeter (*Latris lineata* Bloch & Schneider), warehou (*Seriola lalandi* Gunther), and Australian salmon (*Arripis trutta* Bloch & Schneider). The effects of gill netting on these fish are largely unknown and must also be considered in any proposals for sound management of the inshore gill net fishery.

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