CHAPTER TWO

THE EXTENT OF OVERFISHING IN THE NORTHERN PRAWN FISHERY

Introduction

2.1 This chapter initially examines conflicting evidence presented during the inquiry on the extent of overfishing of the tiger prawn stock. The evidence presented by CSIRO, including the latest data for 1999, indicated that the tiger prawn catch has declined significantly since the early 1980s, raising concern for the continued viability of the fishery. However, the NPF (Qld) TA argued that this decline partly reflects variations in catching effort.

2.2 The chapter also examines CSIRO's recommendation for a 35 per cent reduction in fishing effort on the tiger prawn stock, based on effort creep in the fishery running at 5 per cent per annum. Again, the need for such a large reduction was disputed by the NPF (Qld) TA and the NTTOA on the basis that effort creep is overstated because current measures fail to take into account seasonal closures and the introduction of by-catch and turtle excluder devices for the forthcoming 2000 season.

Overfishing

2.3 In correspondence with the Committee, Dr Hill from CSIRO indicated that the catch of tiger prawns in the tiger prawn fishery (which also includes endeavour prawns and king prawns) has fallen from around 5,000 tonnes in the early 1980s to around 2,000 tonnes in 1999. These estimates correct data presented in CSIRO's written submission indicating that the tiger prawn catch has fallen from 8,000 tonnes to the present 2,000 tonnes.[1]

2.4 Table 2.1 below presents official CSIRO estimates from 1968 to 1999 of the annual catch by species (banana, tiger, endeavour and king) in the NPF. The table was updated on 21 February 2000 with respect to the 1998 figure, and also incorporates the latest data for 1999 (although the figure may vary as additional checks are made). The table shows a significant decline in the catch of tiger prawns from a peak of 5,751 tonnes in 1983 to a low of 2,136 tonnes in 1999.

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1 CSIRO Correspondence, 22 February 2000, p 2

Table 2.1: Annual catch by species (tonnes) in the NPF: 1968 - 1999

Year	Catch by Species (tonnes)				
	Tiger	*Banana*	*Endeavour*	*King*	*Total*
1968	121	1978	49	0	2148
1969	570	1070	275	0	1915
1970	1138	1702	417	0	3257
1971	1183	7364	400	0	8948
1972	1380	4801	472	0	6654
1973	1672	4226	594	0	6492
1974	666	12711	434	4	13815
1975	973	3160	444	6	4583
1976	1118	4519	675	5	6319
1977	2900	6345	1125	28	10398
1978	3599	2535	1240	82	7456
1979	4218	4775	1213	94	10300
1980	5124	2835	1891	111	9964
1981	5559	5672	2073	95	13400
1982	4891	3875	2124	144	11036
1983	5751	2382	1488	207	9831
1984	4525	3770	1714	83	10095
1985	3592	4469	1671	77	9811
1986	2682	2935	748	85	6451
1987	3617	4257	772	65	8713
1988	3458	3381	669	81	7591
1989	3173	5466	909	85	9636
1990	3550	2221	735	128	6636
1991	3987	6605	879	81	11554
1992	3084	2254	880	47	6267
1993	2515	4292	733	35	7572
1994	3162	2157	872	72	6263
1995	4125	4961	1150	58	10294
1996	2311	4078	1235	41	7665
1997	2694	4587	1870	51	9202
1998	3218	3569	1322	20	8123
1999	2136	3904	885	21	6947

2.5 In response to concerns that the tiger prawn stock is overfished, the NPF (Qld) TA pointed out in their submission that it is not their intention to question the status of the resource. They argued that there is a range of factors which could account for fluctuations in total landings. These factors include seasonal and environmental factors. The submission stressed the link between effort exerted on the fishery and the potential catch.

2.6 Accordingly, the NPF (Qld) TA argued that the decline in catch rates is overstated.[2] In support, the NPF (Qld) TA cited data on the annual catch (tonnes) of tiger prawns and effort expended (boat days) across the entire fishery from 1970 to 1999. From these estimates, the NPF (Qld) TA derived a measure of the catch of tiger prawns per unit of effort (CPUE) (t/day). This is shown in Table 2.2 below.

Table 2.2: Annual Catch (tonnes), effort (boat days), vessel numbers and average CPUE (t/day): 1970 - 1998

Year	Total Catch (tonnes)	No. of Vessels	Effort in the NPF (days)	CPUE
1970	1138	191	7859	0.145
1971	1183	169	11628	0.102
1972	1380	180	11707	0.118
1973	1672	217	12279	0.136
1974	666	196	10976	0.061
1975	973	107	11371	0.086
1976	1118	145	13898	0.080
1977	2900	193	18930	0.153
1978	3599	237	24318	0.148
1979	4218	240	25119	0.168
1980	5124	269	38985	0.131
1981	5559	286	43419	0.128
1982	4891	271	41707	0.117
1983	5751	254	41407	0.139
1984	4525	252	38379	0.118
1985	3592	231	33462	0.107
1986	2682	238	33801	0.079
1987	3617	234	30432	0.119
1988	3458	222	32919	0.105
1989	3173	223	34475	0.092
1990	3550	200	30569	0.116
1991	3987	172	27259	0.146
1992	3084	170	26921	0.115
1993	2515	127	22318	0.113
1994	3162	128	23547	0.134
1995	4125	125	21721	0.190
1996	2311	127	22160	0.104
1997	2694	129	20861	0.129
1998	3250	130	23304	0.139

2.7 CSIRO provided the Committee with alternative data on the CPUE (t/day) comparing catches of all species in the tiger and banana prawn fisheries with the effort in days expended in each fishery. This is cited in Table 2.3 below. Again the data was

2 Submission 74, p 25

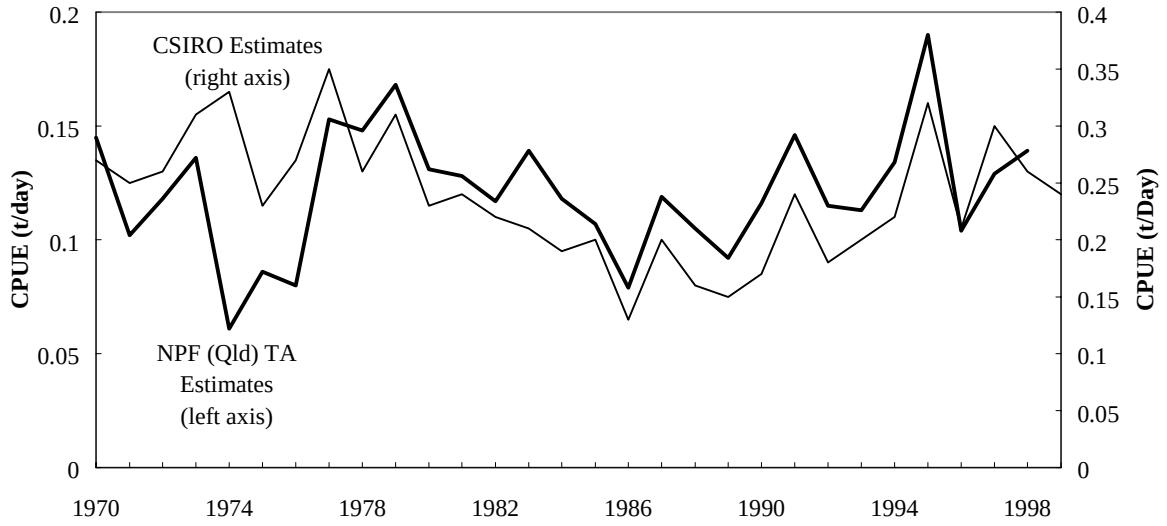
updated on 21 February 2000 with respect to the 1998 figure, and incorporates the latest data for 1999.

Table 2.3: Annual Catch (tonnes), effort (boat days) and CPUE (t/day) in the banana and tiger fisheries: 1970 - 1999

Year	Banana Prawn Fishery			Tiger Prawn Fishery		
	Catch (tonnes)	*Effort (days)*	*CPUE (t/day)*	*Catch (tonnes)*	*Effort (days)*	*CPUE (t/day)*
1970	1670	2041	0.82	1587	5818	0.27
1971	7431	5571	1.33	1517	6057	0.25
1972	4767	4327	1.10	1888	7380	0.26
1973	4197	4917	0.85	2295	7362	0.31
1974	12696	7537	1.68	1119	3439	0.33
1975	3173	5361	0.59	1410	6010	0.23
1976	4516	7238	0.62	1803	6660	0.27
1977	6336	7257	0.87	4062	11673	0.35
1978	2520	5569	0.45	4936	18749	0.26
1979	4738	7328	0.65	5562	17791	0.31
1980	2817	8391	0.34	7147	30594	0.23
1981	5658	11524	0.49	7742	31895	0.24
1982	3939	8751	0.45	7097	32956	0.22
1983	2423	6856	0.35	7407	34551	0.21
1984	3806	5932	0.64	6289	32447	0.19
1985	4476	6946	0.64	5335	26516	0.20
1986	2964	7132	0.42	3487	26669	0.13
1987	4312	7954	0.54	4401	22478	0.20
1988	3433	6655	0.52	4157	26264	0.16
1989	5472	7439	0.74	4164	27036	0.15
1990	2250	5044	0.45	4386	25525	0.17
1991	6626	6515	1.02	4928	20744	0.24
1992	2291	5132	0.45	3976	21789	0.18
1993	4319	6299	0.69	3253	16019	0.20
1994	2196	4955	0.44	4067	18592	0.22
1995	4961	4880	1.02	5333	16834	0.32
1996	4098	5525	0.74	3567	16635	0.21
1997	4618	5476	0.84	4584	15385	0.30
1998	3625	5301	0.68	4640	18003	0.26
1999	3967	5639	0.70	2986	12675	0.24

2.8 Although Tables 2.2 and 2.3 are based on alternative data sources, this does not significantly alter the trend changes in CPUE since 1970. This is shown in Chart 2.1, which charts both the NPF (Qld) TA and CSIRO measures of CPUE respectively.

Chart 2.1: CPUE in the NPF



2.9 Based on Chart 2.1, the NPF (Qld) TA indicated that throughout the 1970s, the tiger prawn catch rate was relatively high, with a peak towards the end of the decade. After 1979, a major decline in the catch rate was experienced, which continued through to the late 1980s. However, the NPF (Qld) TA notes that the catch rate has subsequently risen in the 1990s, which it attributes to the large reduction in the number of vessels in the NPF and increased season closures.[3]

2.10 The Committee accepts that the tiger prawn catch rate has improved in the 1990s. However, this should not disguise the fact that total landings have continued to decline. The NPF (Qld) TA argued that the decline in total landings in the tiger prawn fishery partly reflects fluctuations in catching effort:

> For example, in 1990 the Fishery produced 3550t of tiger and yet in 1997 it only produced 2694t. This drastic reduction can partly be explained by the corresponding fishing effort required to take those catches.[4]

2.11 However, this argument seems counter-intuitive. While the NPF (Qld) TA may argue that nominal effort determines total tiger landings, it seems more likely that total tiger landings determine nominal effort. As CSIRO indicated in its written submission, 'the continuing decline in overall landing suggests that there is a problem'.[5]

Effort Creep

2.12 In its written submission, CSIRO reiterated the NPFAG estimate that effort creep in the NPF is running at 5 per cent per annum. As indicated, only 2.5

3 Submission 74, pp 24-25

4 Submission 74, p 23

5 Submission 78, pp 1-3

percentage points of this 5 per cent are quantifiable. However, CSIRO again noted that it cannot quantify the impact on effort creep of improvements in net and trawl board design, new types of propellers, changes in hull design and the introduction of new vessels. Accordingly, the 5 per cent figure is adopted on a precautionary basis.[6]

2.13 In hearings, Dr Hill from CSIRO acknowledged the importance of the 5 per cent estimate to current assessments of the level of overfishing:

> If you said that the only effort creep was 2.5 per cent, yes, you would come to a different conclusion about the stocks. If you could say, 'Look, this effort creep thing is a lot of nonsense, it does not exist', then you would come to a different conclusion again.[7]

2.14 In response, the NPF (Qld) TA argued that CSIRO fails to discount recent measures that have led to a reduction of effort. CSIRO agreed that all factors are not included in the calculation of effort creep.[8] These factors include daylight trawling bans, area closures and reduction of quad nets to double nets. Accordingly, the NPF (Qld) TA noted that in the past decade, four studies have been completed estimating significantly lower effort creep of between 1.5 per cent and 5 per cent per annum.

Effort Reduction

2.15 CSIRO also reiterated in its written submission the NPFAG estimate that in 1998, for all tiger prawns, effective fishing effort was 35 per cent above MSY.[9] In its supplementary submission, the NTTOA noted that the 35 per cent figure applied only to 1998 effort (based on the failure of the 1998 area closure), and that the NPFAG recommended a smaller 25-30 per cent reduction in effort in 1999 to return to MSY levels.[10]

2.16 In response, the NPF (Qld) TA provided the Committee with an advanced copy of the 1999 draft Fisheries Assessment Group Working Paper, prepared by Ms Dichmont and Ms Bishop from CSIRO Marine Research. Development of this report only began on 7 February 2000, following hearings in Brisbane. The paper remains a draft, and has yet to be subject to reviewed by the NPFAG.

2.17 The draft working paper indicates that the 1999 season closures may have achieved up to a 32 percentage point reduction in effort on tiger prawns, when compared to the previous season in 1998. As a result, it is estimated that effective fishing effort on the tiger prawn stock was only 3 per cent above that required to take MSY. On this basis, the NPF (Qld) TA stated:

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6 Submission 78, pp 1-3

7 Evidence, RRAT, 3 February 2000, p 21

8 Evidence, RRAT, 3 February 2000, p 21

9 Submission 78, p 3

10 Submission 75A, pp 1-2

> The results provide conclusive evidence our Fishery is actually in a healthier state today than it would have been if gear units had been introduced two years ago, as initially planned and that the current system can and does reduce effort effectively and predictably.[11]

2.18 However, in correspondence with the Committee AFMA disputed this claim, noting that part of the reduction in effort in 1999 was due to:

- An increase in the number of days spent by vessels in other fisheries, up from 200 boat days in 1998 to 1400 boat days in 1999. AFMA argued that this explains 23 per cent of the reduction in fishing effort.
- A switch in effort from tiger to banana prawns. In particular, banana prawn catches in August, traditionally a period when tiger prawns are caught, increased by more than 230 per cent.[12]

2.19 In addition to the 1999 draft Fisheries Assessment Group Working Paper, the NPF (Qld) TA also argued that the introduction of by-catch and turtle excluder devices (to which they are not opposed) for the forthcoming 2000 season would cost operators an additional 5 – 8 per cent of their catch.[13]

2.20 The Committee was not presented with any evidence to support this claim during hearings. Dr Hill indicated that CSIRO has not undertaken any research on the impact of turtle excluder devices on the catch of prawns, but that from a biological point of view, he supported the introduction of such devices:

> If this is going to result in less pressure on tiger prawns but we cannot quantify it, well, that is just too bad because, again as a biologist, my concern is about prawn stocks …[14]

2.21 The Committee also notes that during hearings, the NPF (Qld) TA proposed an industry-funded research vessel be made available to CSIRO to assist in research into overfishing and effort creep.[15] In response, Dr Hill from CSIRO indicated that the availability of a research vessel would be a considerable advantage, given that the remoteness of the area makes conducting research very expensive. In particular, chartering a vessel costs thousands of dollars a day.[16]

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11 Submission 74B, p 1

12 AFMA Correspondence, 6 March 2000, pp 2-3

13 Submission 74, p 25

14 Evidence, RRAT, 3 February 2000, p 15

15 Submission 74, pp 31-32

16 Evidence, RRAT, 3 February 2000, p 18