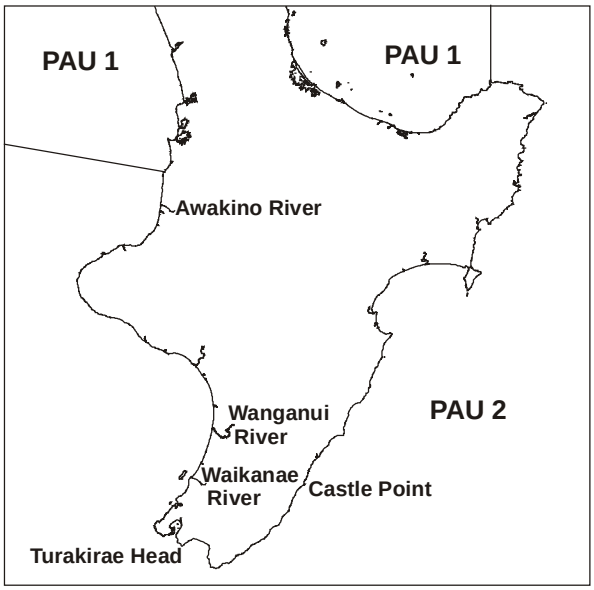
PAUA (PAU 2) – Wairarapa / Wellington / Taranaki

(*Haliotis iris*)
Paua



1. FISHERY SUMMARY

PAU 2 was introduced into the Quota Management System in 1986-87 with a TACC of 100 t. As a result of appeals to the Quota Appeal Authority, the TACC was increased to 121.19 t in 1989 and has remained unchanged to the current fishing year (Table 1). There is no TAC for this QMA: before the Fisheries Act (1996) a TAC was not required. When changes have been made to a TACC after 1996, stocks have been assigned a TAC.

Table 1: Total allowable catches (TAC, t) allowances for customary fishing, recreational fishing, and other sources of mortality (t) and Total Allowable Commercial Catches (TACC, t) declared for PAU 2 since introduction to the QMS.

Year	TAC	Customary	Recreational	Other mortality	TACC
1986 - 1989	-	-	-	-	100
1989 - present	-	-	-	-	121.19

1.1 Commercial fisheries

The fishing year runs from 1 October through 30 September. Most of the commercial catch comes from the Wairarapa and Wellington South coasts between Castle Point and Turakirae Head. The western area between Turakirae Head and the Waikanae River is closed to commercial fishing.

On 1 October 2001 it became mandatory to report catch and effort using fine-scale reporting areas developed by the New Zealand Paua Management Company for their voluntary logbook program (Figure 1). These reporting areas were subsequently adopted on MFish PCELRs.

1.2 Recreational fisheries

For further information on recreational fisheries refer to the introductory PAU Working Group Report.

Because paua around Taranaki are naturally small and never reach the minimum legal size (MLS) of 125 mm, a new MLS of 85 mm was introduced for recreational fishers from 1 October 2009. The new length is on a trial basis for five years and applies between the Awakino and Wanganui rivers.

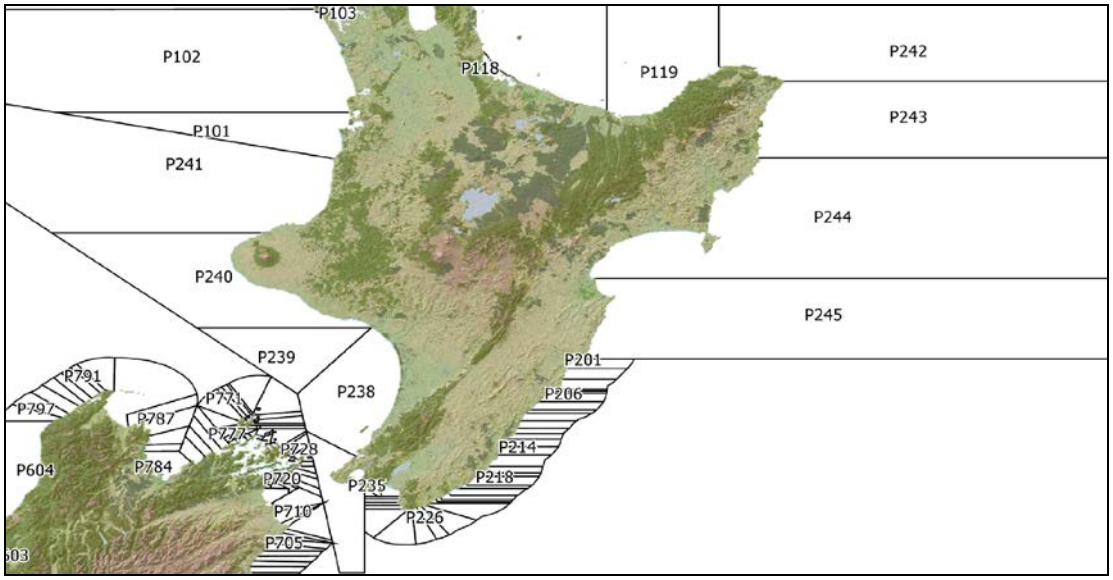


Figure 1: Map of fine scale statistical reporting areas for PAU 2.

Landings for PAU 2 are shown in Table 2.

Table 2: TACC and reported landings (t) of paua in PAU 2 from 1983-84 to present

Year	Landings	TACC
1983–84*	110	–
1984–85*	154	–
1985–86*	92	–
1986–87*	96.2	100
1987–88*	122.11	111.33
1988–89*	121.5	120.12
1989–90	127.28	121.19
1990–91	125.82	121.19
1991–92	116.66	121.19
1992–93	119.13	121.19
1993–94	125.22	121.19
1994–95	113.28	121.19
1995-96	119.75	121.19
1996-97	118.86	121.19
1997-98	122.41	121.19
1998-99	115.22	121.19
1999-00	122.48	121.19
2000-01	122.92	121.19
2001-02	116.87	121.19
2002-03	121.19	121.19
2003-04	121.06	121.19
2004-05	121.19	121.19
2005-06	121.14	121.19
2006-07	121.20	121.19
2007-08	121.06	121.19
2008-09	121.18	121.19
2009-10	121.13	121.19
2010-11	121.18	121.19
2011-12	120.01	121.19

* FSU data.

1.3 Customary fisheries

For further information on customary fisheries refer to the introductory PAU Working Group Report.

1.4 Illegal catch

It is widely believed that the level of illegal harvesting is high around Wellington and on the Wairarapa coast. For further information on illegal catch refer to the introductory PAU Working Group Report.

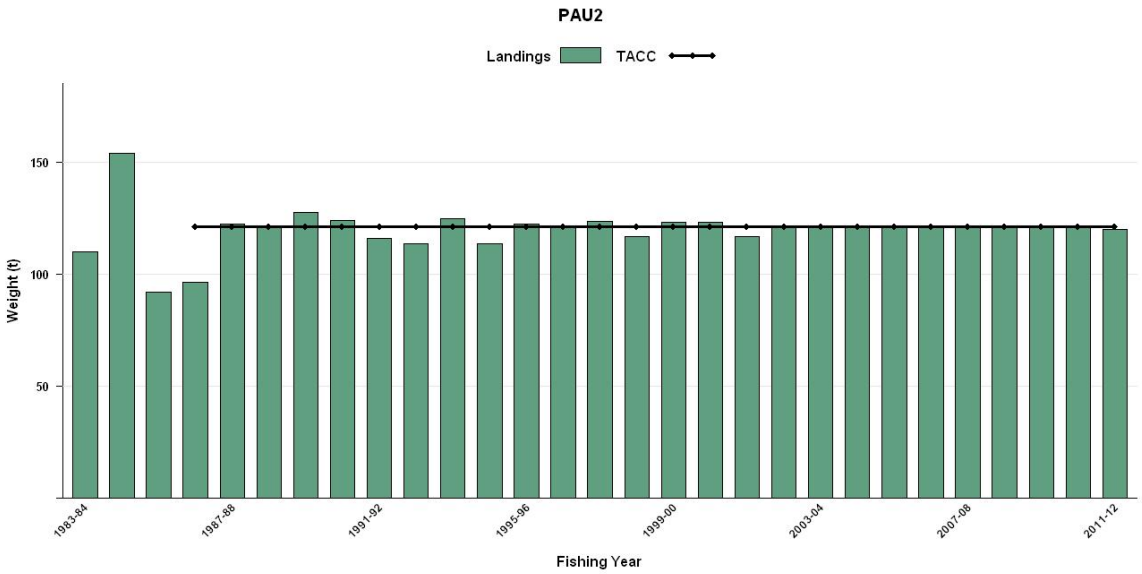


Figure 2: Historical landings and TACC for PAU2 from 1983-84 to present. QMS data from 1986-present.

1.5 Other sources of mortality

For further information on other sources of mortality refer to the introductory PAU Working Group Report.

2. BIOLOGY

For further information on paua biology refer to the introductory PAU Working Group Report. A summary of published estimates of biological parameters for PAU 2 is presented in Table 3.

Table 3: Estimates of biological parameters (*H. iris*)

Area		Estimate	Source
1. Size at maturity (shell length)			
Wellington	50% mature	71.7 mm	Naylor *et al.* (2006)
Taranaki	50% mature	58.9 mm	Naylor & Andrew (2000)
2. Fecundity = a (length)^b (eggs, shell length in mm)			
Taranaki	a = 43.98	b = 2.07	Naylor & Andrew (2000)
3. Exponential growth parameters (both sexes combined)			
Wellington	g_{50}	30.58 mm	Naylor *et al.* (2006)
	g_{100}	14.8 mm	
Taranaki	G_{25}	18.4 mm	Naylor & Andrew (2000)
	G_{75}	2.8 mm	

3. STOCKS AND AREAS

For further information on stocks and areas refer to the introductory PAU Working Group Report.

4. RELATIVE ABUNDANCE INDEX

A standardised CPUE index based on commercial catch was constructed covering the 1990 to 2007 fishing years (McKenzie *et al.* 2009). The index was based on CELR data for 1990 to 2001, and PCELR data collapsed into CELR format for 2002 to 2007, with units of kg per diver day. The index shows a decline from 1990 to 1992, increasing to 2000, then fluctuating but essentially constant since (Table 4, Figure 3). A large portion of PAU 2, including the Wellington south coast, is closed to commercial fishing. This means that the CPUE series collected from the commercial catch and effort data are

exclusive of this large area. Given that it is widely believed that the level of illegal harvesting is high around Wellington, the abundance of paua in the fishery as a whole will not be captured very well by the CPUE index, which will only reflect abundance outside of the closed area. This is a cause for concern if stocks in the closed area are being depleted.

CPUE is difficult to use as an estimate of abundance due to its ability to mask serial depletion. Serial depletion occurs when fishers deplete an unfished or lightly fished bed therefore maintaining or increasing their catch rates, CPUE stays high while the biomass is actually decreasing. CPUE should be treated with caution as index of abundance.

Table 4: The standardised CPUE for PAU 2, 1990-2007.

Fishing year	Number of records	Standardised CPUE	CV
1990	288	111	0.11
1991	413	91	0.10
1992	320	86	0.10
1993	286	96	0.11
1994	253	92	0.10
1995	220	107	0.11
1996	230	108	0.11
1997	228	111	0.11
1998	141	139	0.12
1999	191	155	0.12
2000	188	162	0.12
2001	180	138	0.12
2002	140	149	0.12
2003	153	157	0.12
2004	148	166	0.12
2005	148	147	0.12
2006	166	156	0.12
2007	166	147	0.12

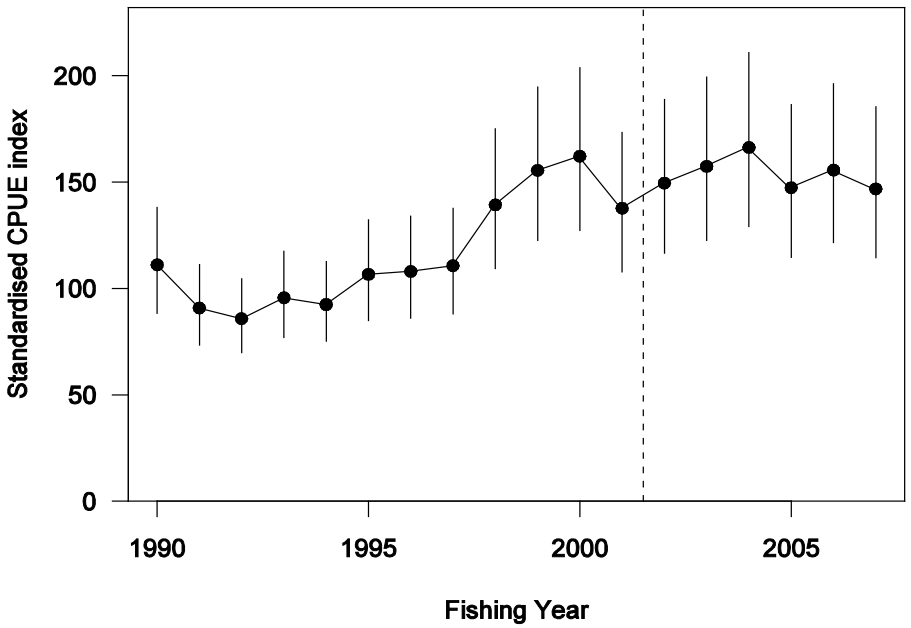


Figure 3: Standardised CPUE index for PAU 2 1990-2007 with 95% confidence intervals. The vertical line delineates between CELR and PCELR data

5. STATUS OF THE STOCKS

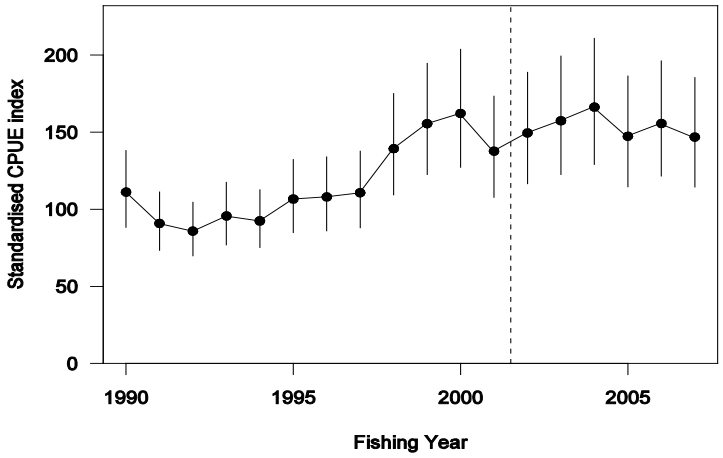
Stock Structure Assumptions

A genetic discontinuity between North Island and South Island paua populations was found approximately around the area of Cook Strait (Will & Gemmell 2008).

- **PAU 2 -** *Haliotis iris*

Stock Status	
Year of Most Recent Assessment	2007
Assessment Runs Presented	Standardised CPUE index
Reference Points	Target: 40% B_0 (Default as per HSS) Soft Limit: 20% B_0 (Default as per HSS) Hard Limit: 10% B_0 (Default as per HSS)
Status in relation to Target	Unknown
Status in relation to Limits	Unlikely (< 40%) to be below the Hard Limit

Historical Stock Status Trajectory and Current Status



Standardised CPUE index for PAU 2 1990-2007 with 95% confidence intervals. The vertical line delineates between CELR and PCELR data.

Fishery and Stock Trends	
Recent Trend in Biomass or Proxy	-
Recent Trend in Fishing Mortality or proxy	-
Other Abundance Indices	Standardised CPUE increased between 1992 and 2000 and has since remained fairly stable up to 2007.
Trends in Other Relevant Indicators or Variables	-

Projections and Prognosis	
Stock Projections or Prognosis	No stock assessment has been undertaken for this stock.
Probability of Current Catch or TACC causing decline below Limits	Soft Limit: Unknown Hard Limit: Unknown

Assessment Methodology		
Assessment Type	-	
Assessment Method	-	
Main data inputs	-	
Period of Assessment	Latest assessment: -	Next assessment: -
Changes to Model Structure and Assumptions	-	
Major Sources of Uncertainty	-	

Qualifying Comments
CPUE is not generally considered to be a reliable indicator of the status of abalone stocks and may not reflect abundance. A large portion of PAU 2, including the Wellington south coast, is closed to commercial fishing. This means that the CPUE series collected from the commercial catch and effort data are exclusive of this large area and therefore the abundance of paua in the fishery as a whole will not be captured very well by the CPUE index.

Fishery Interactions
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6. FOR FURTHER INFORMATION

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