

Abalone poaching confiscation numbers and trends for Zones A-D updated to include data until 2009

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SUMMARY

Poaching confiscation data have been updated using all data currently available until the third quarter of 2009. The data have been reworked in terms of a standard Model year y that is taken to run from October of year $y-1$ to September of year y . This was necessary for reasons of internal consistency in the assessment process which uses a Model year defined in this manner.

The data provided by A. Mackenzie have been reworked in the same way as Plagányi (2008), and the "revised" trend and minimum numbers confiscated are given in this document.

Poaching trend assumptions

The poaching confiscation data are used to obtain base-case estimates of the trend in poaching over time in each of Zones A-D. A better measure of changes in the level of poaching in a Zone is not confiscation *per se*, but the Confiscations Per Unit of Policing Effort (CPUPE). Table 1 shows the poaching trend based only on the location-known zonal confiscation data as provided by Mackenzie and Maharaj (2009). The 2009 values have been extrapolated as confiscated numbers were only available for part of the Model year. The values for 2008 have also been updated from those presented in the previous analyses of Plagányi (2008). As in previous years, a linear increase in poaching (from zero in 1990 increasing up to the 1994 level) is assumed for Zone C and for Zone D (from zero in 1991 increasing up to the 1994 level) because confiscation data are available only from 1994 onwards. Poaching is thought to have started earlier in these Zones than in Zones A and B.

The policing efficiency levels shown in Table 2 represent the "best guess" of the increase in policing efficiency based on knowledge of police operations (as previously advised by Marcel Kroese, MCM and more recently by Pedro Goosen, MCM). Note that, for example, a policing level factor of 2 implies a 100% increase in policing efficiency so that the corresponding confiscation amounts are multiplied by a factor of 0.5 to make them comparable to the other values. This year as last year a revised index was provided and this index is shown in Table 2b. As the policing efficiency level estimated for 2009 for the revised data is the same as that in 2008, the original index has been updated by similarly assuming that the 2009 value is the same as the 2008 value (see Table 2a).

The revised poaching trends for use as inputs (in terms of relative numbers poached) into the 2009 model runs are summarised in Table 2 and Figures 1-2. The Figures also show a

3-point moving average superimposed on each plot. These smoothed plots are used as inputs to the model in preference to the unsmoothed CPUPE trends.

The analyses presented in this paper include updated data for Model year 2008, as well as new data for Model year 2009.

Assumptions regarding numbers confiscated

Table 3 shows the total number of abalone confiscated per Zone per Model year. The Table shows the TOTAL number of abalone confiscations per Zone if the Zone "Unknown" confiscation component is assumed to be appropriately allocated to the various Zones in the same proportion as the relative number of confiscations per Zone. The values shown in Table 3 are also used as a diagnostic check in scenarios in which the poaching level is estimated within the population model: they represent the minimum realistic poaching estimates (i.e. the actual amount poached must be greater than the corresponding confiscation estimates).

Acknowledgements

Data were provided by Angus MacKenzie and Genevieve Maharaj, MCM, who are gratefully acknowledged.

Reference

Mackenzie, A. and Maharaj, G. 2009. Summary of data updates for the abalone fishery in Zones A-D in 2009, including commercial, poaching and FIAS size composition and catch-at-age, FIAS abundance and confiscation numbers. Marine and Coastal Management document: MCM/2009/AUG/SWG-AB/02.

Plagányi, É. 2008. Abalone confiscation numbers and trends summary for Zones A-D in 2008. Marine and Coastal Management document: MCM/2008/NOV/SWG-AB/17.

Table 1. Summary of “Zone-known” confiscations for each of Zones A-D, as given in Table 6 of Mackenzie and Maharaj (2009). The data include adjustments to account for takes from Betty’s Bay and Dyer Island. These data are used to compute the poaching trend scenarios given in the next table. Note that the 2009 values are extrapolations as data were available for only part of the Model year.

Model year	Zone A	Zone B	Zone C	Zone D
1994	0	415	9 852	1 081
1995	0	2 633	15 145	2 654
1996	0	1 502	12 658	1 560
1997	5 843	4 470	15 961	2 969
1998	24 673	7 663	10 674	3 521
1999	13 470	3 656	6 843	2 393
2000	8 316	22 756	7 373	5 811
2001	9 289	42 086	4 746	8 733
2002	47 927	171 046	10 521	16 982
2003	31 222	89 826	6 819	12 640
2004	56 496	123 257	9 148	3 757
2005	40 731	66 267	3 307	3 871
2006	66 358	72 922	2 826	3 783
2007	74 849	42 364	1 471	1 919
2008	55 846	35 108	3 858	3 229
2009 <i>(extrapolated)</i>	49 920	65 267	2 828	3 983

Table 2. Summary of a) base- case and b) revised trend for each of the abalone fishery Zones A-D. Note that the proportions in each column represent the poaching intensity in that Zone relative to the maximum poaching level observed for that Zone. The "policing efficiency levels" shown in the last columns were proposed to the Abalone Working Group by Kroese for the base-case and by Goosen for the revised-case and have been used to derive modified time series representing confiscations-per-unit-policing. For all Zones A-D, all years from 1980 to 1993 are set to 10% of the 1997 value; and for Zone A, years from 1994 to 1996 are similarly set to 10% of the 1997 Zone A value.

a) Base-case

Model year	Zone A	Zone B	Zone C	Zone D	Policing efficiency level
Pre-1980	0.000	0.000	0.000	0.000	
1980-1989	0.007	0.003	0.096	0.020	
1990	0.007	0.003	0.096	0.020	
1991	0.007	0.003	0.096	0.020	
1992	0.007	0.003	0.096	0.020	
1993	0.007	0.003	0.096	0.020	
1994	0.007	0.003	0.651	0.080	1
1995	0.007	0.019	1.000	0.195	1
1996	0.007	0.011	0.836	0.115	1
1997	0.071	0.030	0.958	0.199	1.1
1998	0.300	0.051	0.641	0.236	1.1
1999	0.144	0.021	0.361	0.141	1.25
2000	0.089	0.133	0.389	0.342	1.25
2001	0.099	0.246	0.251	0.514	1.25
2002	0.512	1.000	0.556	1.000	1.25
2003	0.334	0.525	0.360	0.744	1.25
2004	0.755	0.901	0.604	0.277	1
2005	0.544	0.484	0.218	0.285	1
2006	0.887	0.533	0.187	0.278	1
2007	1.000	0.310	0.097	0.141	1
2008	0.746	0.257	0.255	0.238	1
2009	0.667	0.477	0.187	0.293	1*

b) Revised-case

Model year	Zone A	Zone B	Zone C	Zone D	Policing efficiency level
Pre-1980	0.000	0.000	0.000	0.000	
1980-1989	0.012	0.003	0.100	0.017	
1990	0.012	0.003	0.100	0.017	
1991	0.012	0.003	0.100	0.017	
1992	0.012	0.003	0.100	0.017	
1993	0.012	0.003	0.100	0.017	
1994	0.012	0.002	0.617	0.064	1
1995	0.012	0.015	0.949	0.156	1
1996	0.012	0.009	0.793	0.092	1
1997	0.117	0.026	1.000	0.175	1
1998	0.494	0.045	0.669	0.207	1
1999	0.270	0.021	0.429	0.141	1
2000	0.167	0.133	0.462	0.342	1
2001	0.186	0.246	0.297	0.514	1
2002	0.960	1.000	0.659	1.000	1
2003	0.626	0.525	0.427	0.744	1
2004	0.906	0.576	0.459	0.177	1.25
2005	0.544	0.258	0.138	0.152	1.5
2006	0.887	0.284	0.118	0.149	1.5
2007	1.000	0.165	0.061	0.075	1.5
2008	0.746	0.137	0.161	0.127	1.5
2009	0.667	0.254	0.118	0.156	1.5

* Assumed on the basis of Goosen's equal values for 2008 and 2009 for the revised-case.

Table 3. Total confiscation estimates per Zone after adding contributions from the “Undefined zone” category. Confiscations per Zone have been adjusted to account for takes from Betty’s Bay and Dyer Island. Values in this table are used to set the minimum number of poached animals that must have been taken from a particular zone in a particular year.

Model year	Zone A	Zone B	Zone C	Zone D
1994	0	415	9 852	1 081
1995	0	9 792	56 322	9 870
1996	0	6 756	56 939	7 017
1997	11 597	8 872	31 679	5 893
1998	70 883	22 015	30 665	10 115
1999	33 748	9 160	17 145	5 995
2000	51 701	141 474	45 838	36 127
2001	31 550	142 942	21 721	24 351
2002	123 772	441 729	35 371	37 037
2003	101 757	292 757	29 812	33 950
2004	146 412	319 427	30 879	10 897
2005	134 233	218 389	14 638	14 481
2006	252 990	278 015	14 689	16 487
2007	401 601	227 303	11 056	11 922
2008	237 492	149 301	22 587	15 770
2009 <i>(extrapolated)</i>	138 792	181 460	10 342	12 449

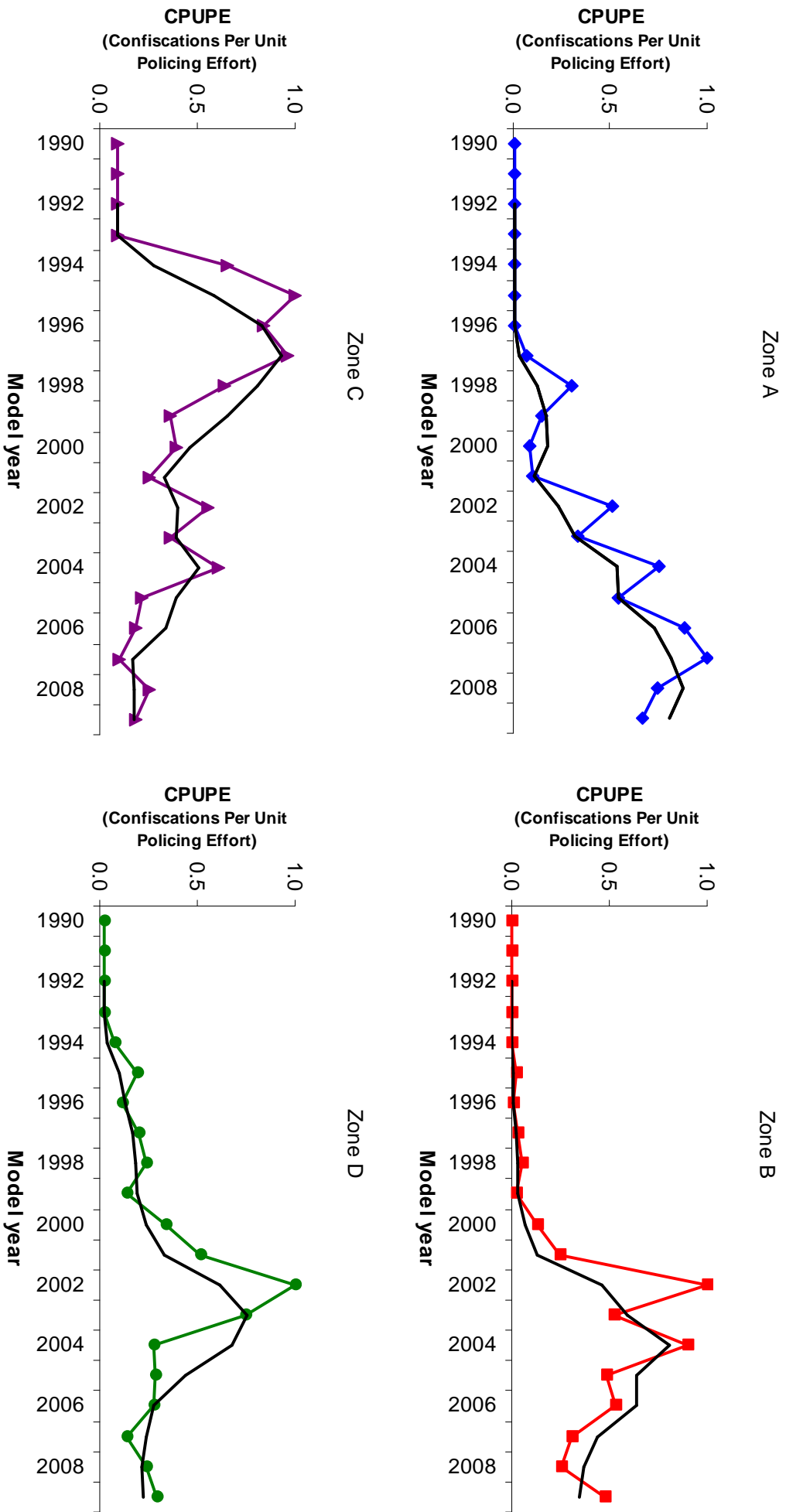


Figure 1. Plots of the base-case CPUPE for each of the Zones A-D. The solid black lines show 3-point moving averages.

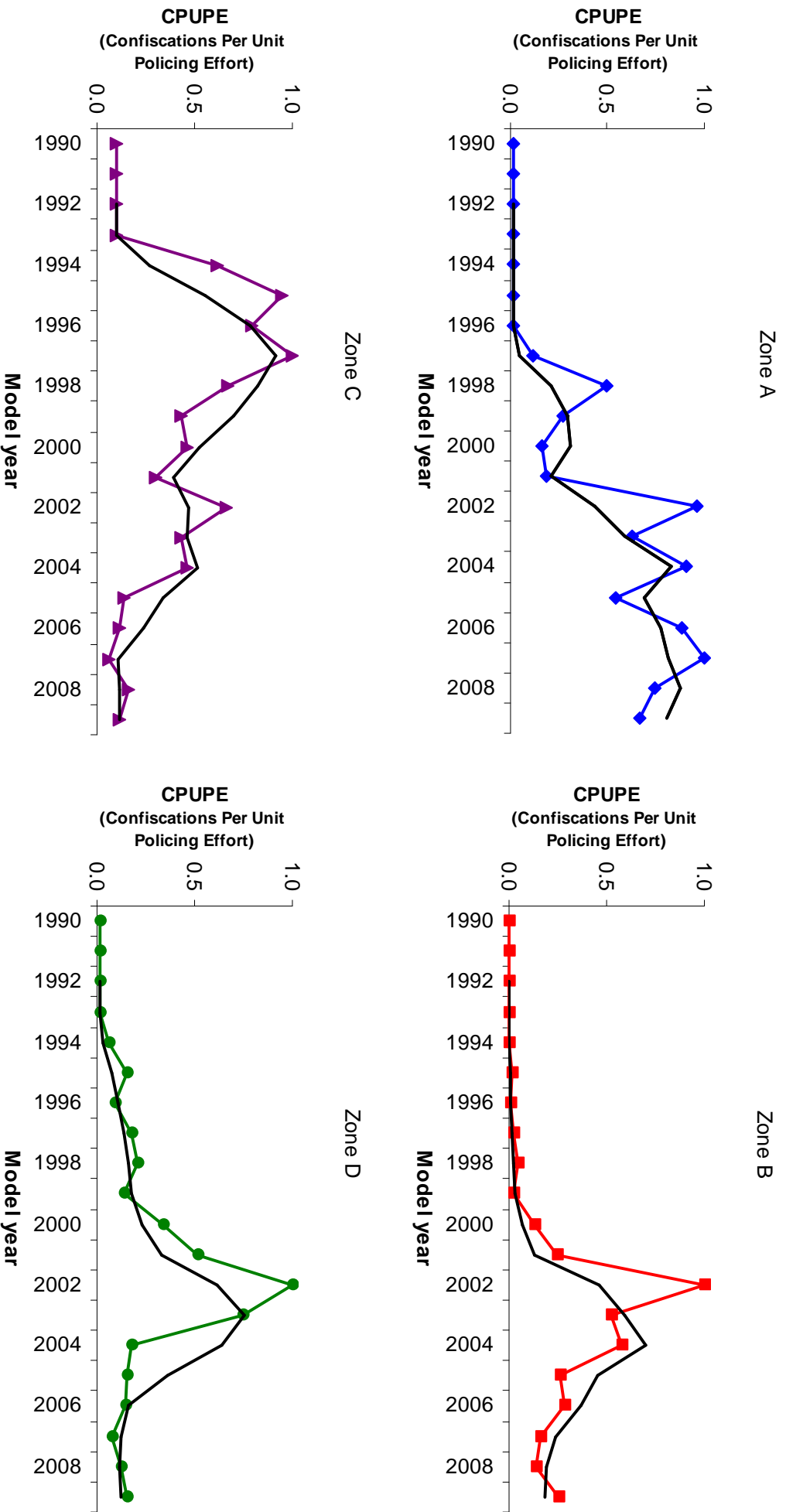


Figure 2. Plots of the revised case CPUPE for each of the Zones A-D. The solid black lines show 3-point moving averages.