Impacts of lack of a bias-correction factor on survival

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The current approach for generating future survival (Eqns 6-8 of MARAM IWC/DEC11/P/PENG/P1) ignores bias correction factors. Consider the simple case when $f_{S(B_{s,y})}=0.15$ and $M_{\min}=0.05$ so that (one hopes) the expected M=0.2 and survival S=0.8187, i.e.:

$$S_y=\exp\left[-0.05+0.15e^{X_y}\right] \qquad X_y \sim N(0;\sqrt{e^{(\tilde{\sigma}/0.15)\wedge 2}-1}) \tag{A}$$

Figure 1 shows histograms of natural mortality and survival for $\tilde{\sigma}$=0.01 and $\tilde{\sigma}$=0.1.

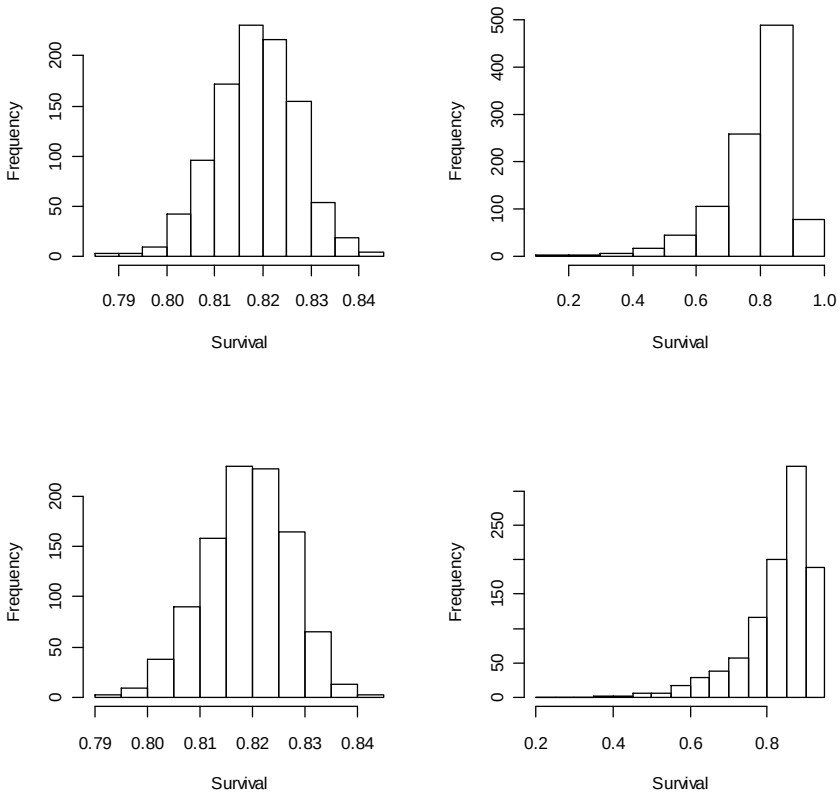

Figure 1. Histograms of survival for $\tilde{\sigma}$=0.01 (left panels) and $\tilde{\sigma}$=0.1 (right panels). The results in the upper panels ignore the bias factor and the lower panels allow for the bias factor.

The mean values for natural mortality and survival for each value for $\tilde{\sigma}$ and whether the bias-correction factor is applied or not.

	Natural Mortality		Survival	
	No bias-correction	With bias-correction	No bias-correction	With bias-correction
$\tilde{\sigma}$=0.01	0.2002	0.1996	0.8186	0.8191
$\tilde{\sigma}$=0.1	0.2538	0.1997	0.7865	0.8257

Conclusion: Use bias-correction factors!!