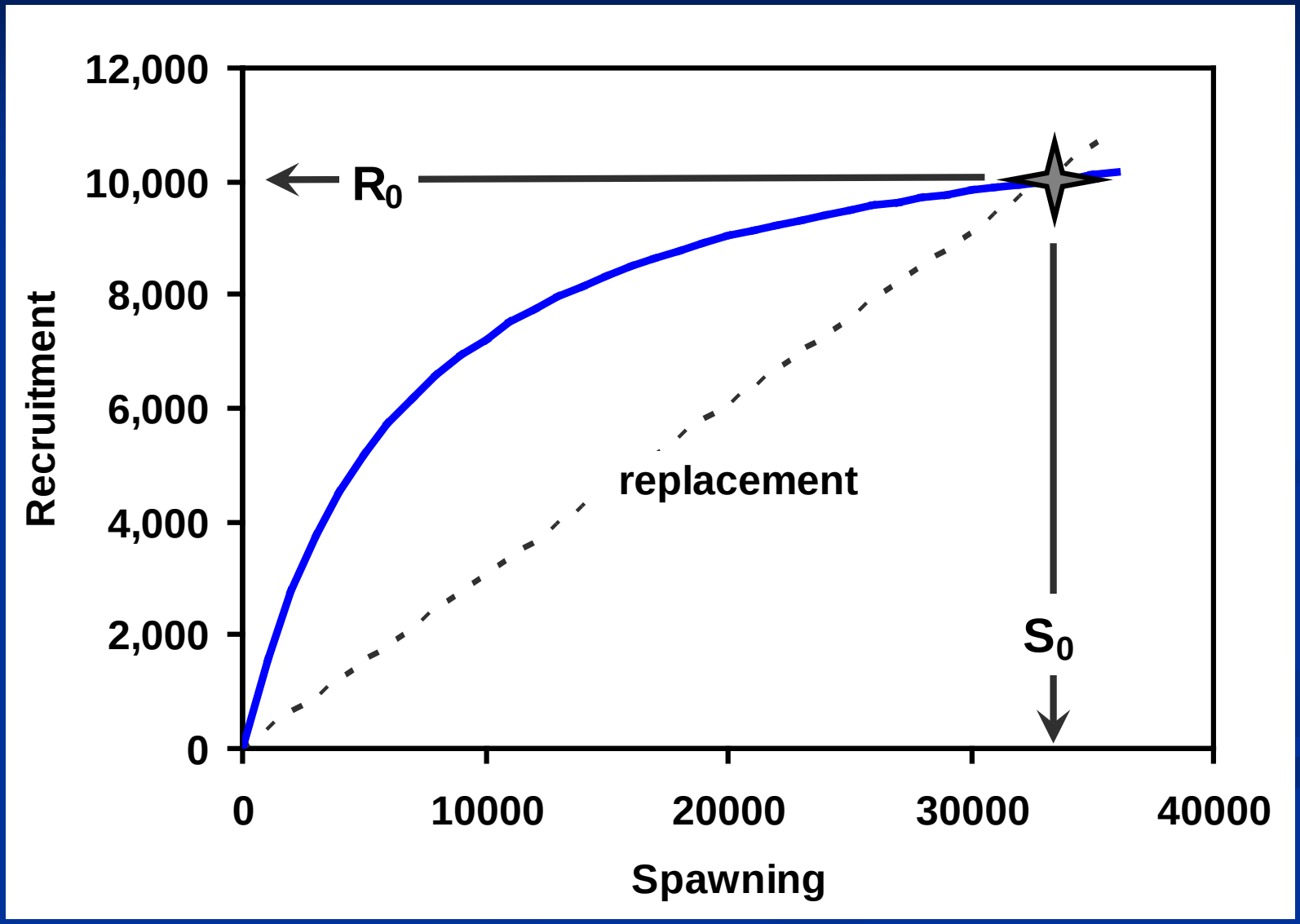
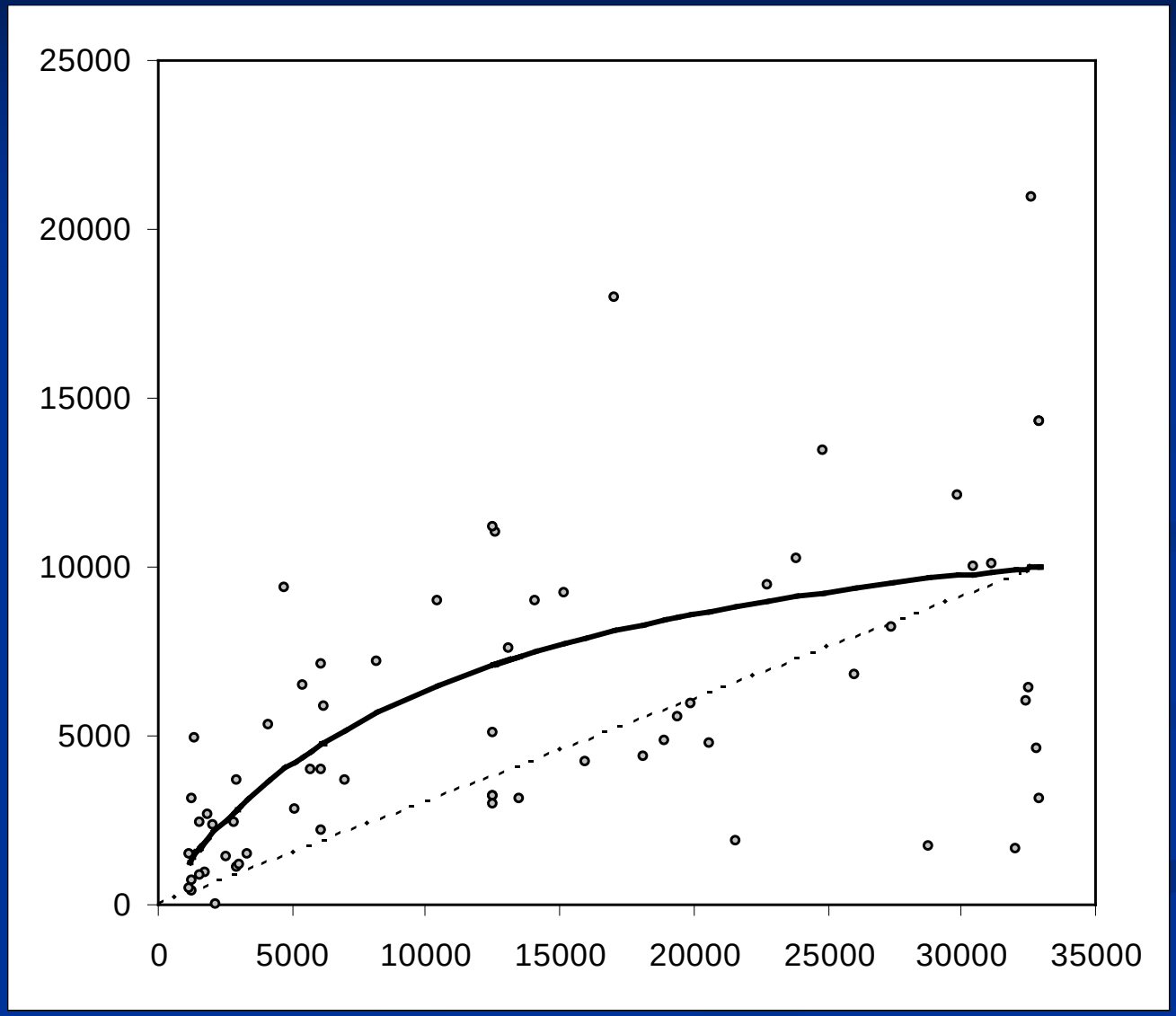
Agenda Item E.2.c
Supplemental SSC PowerPoint
September 2009

Figures to Follow on Next Pages

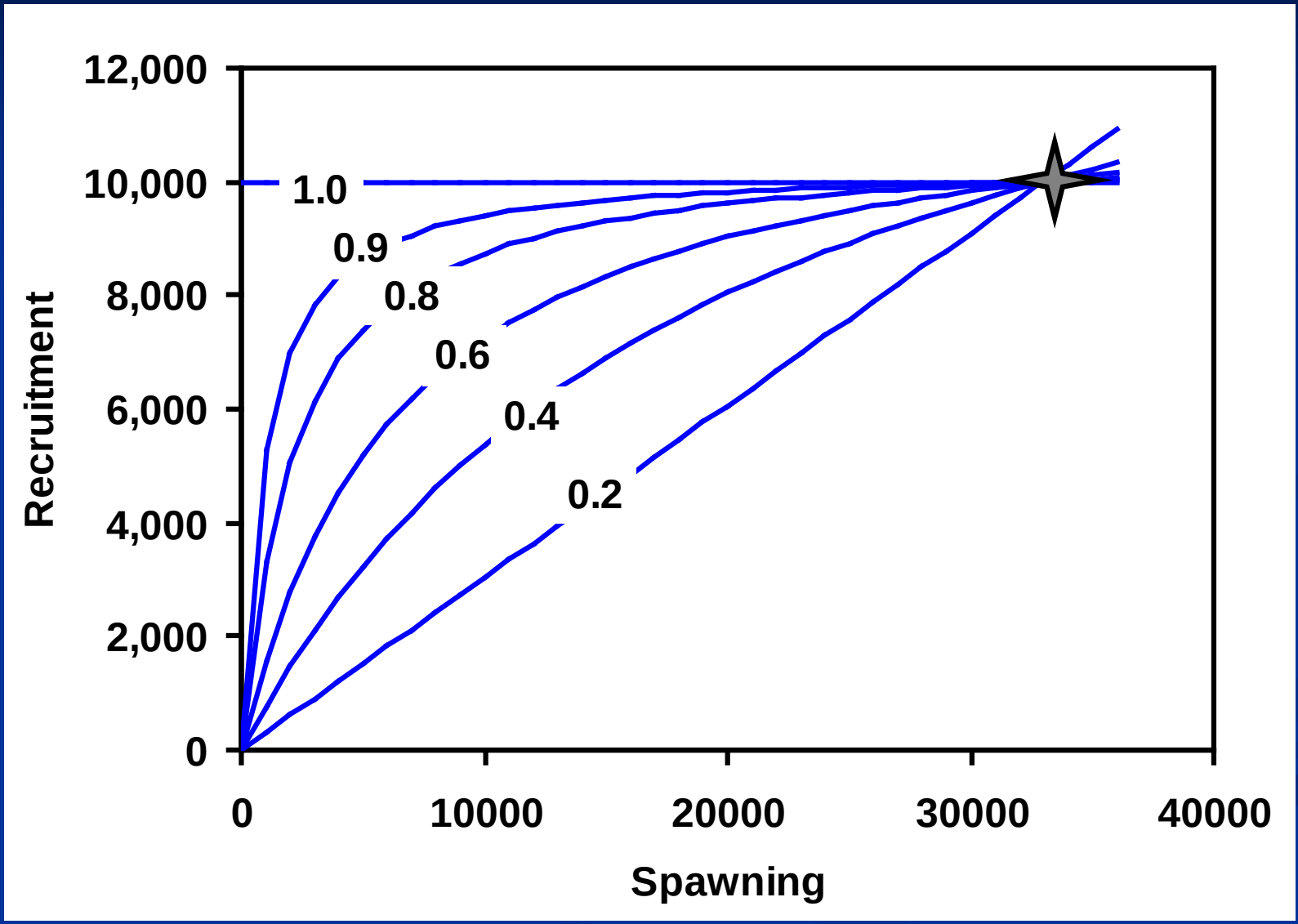
A Beverton-Holt Spawner-Recruit Curve



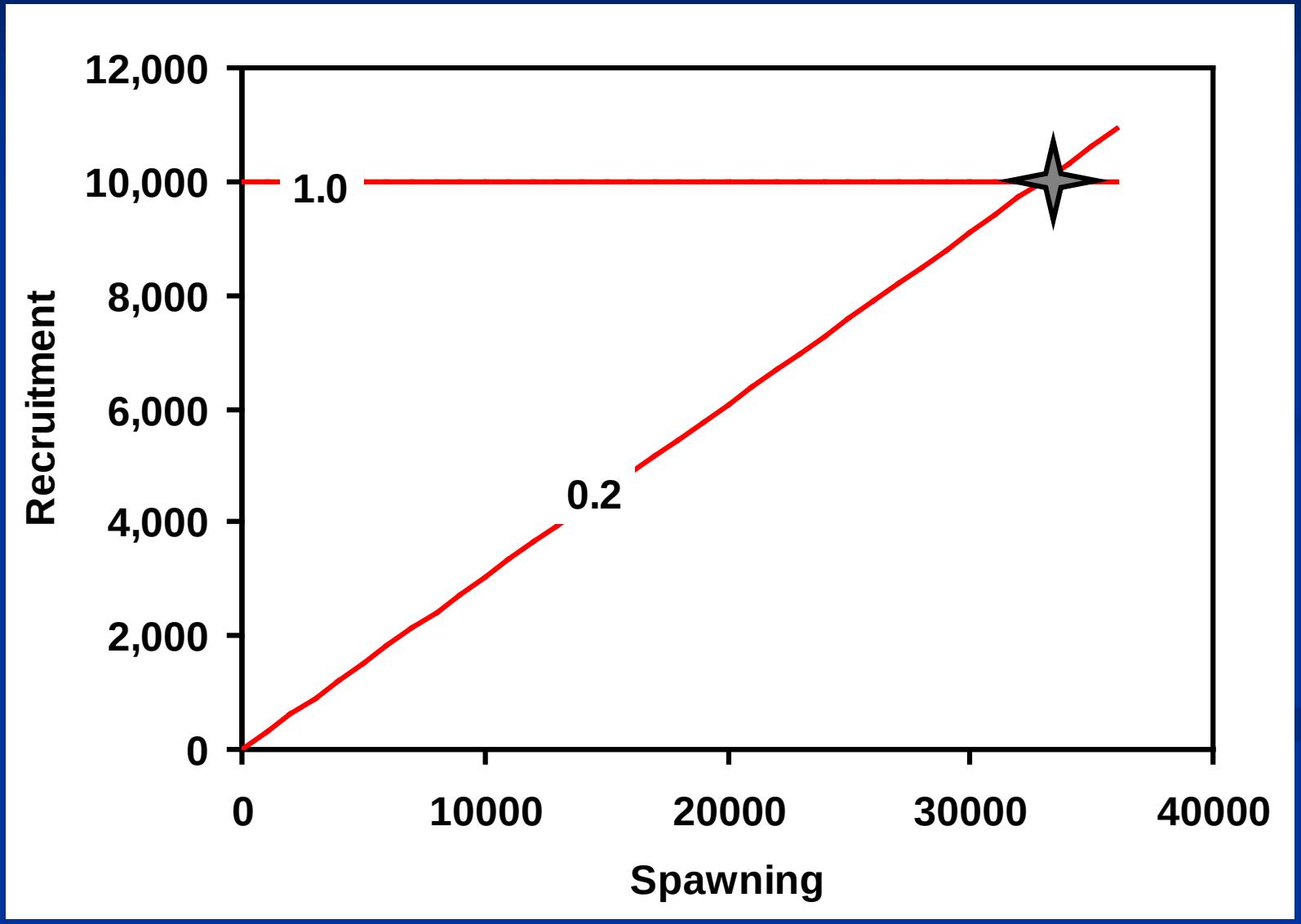
Estimate the Curvature With Noise



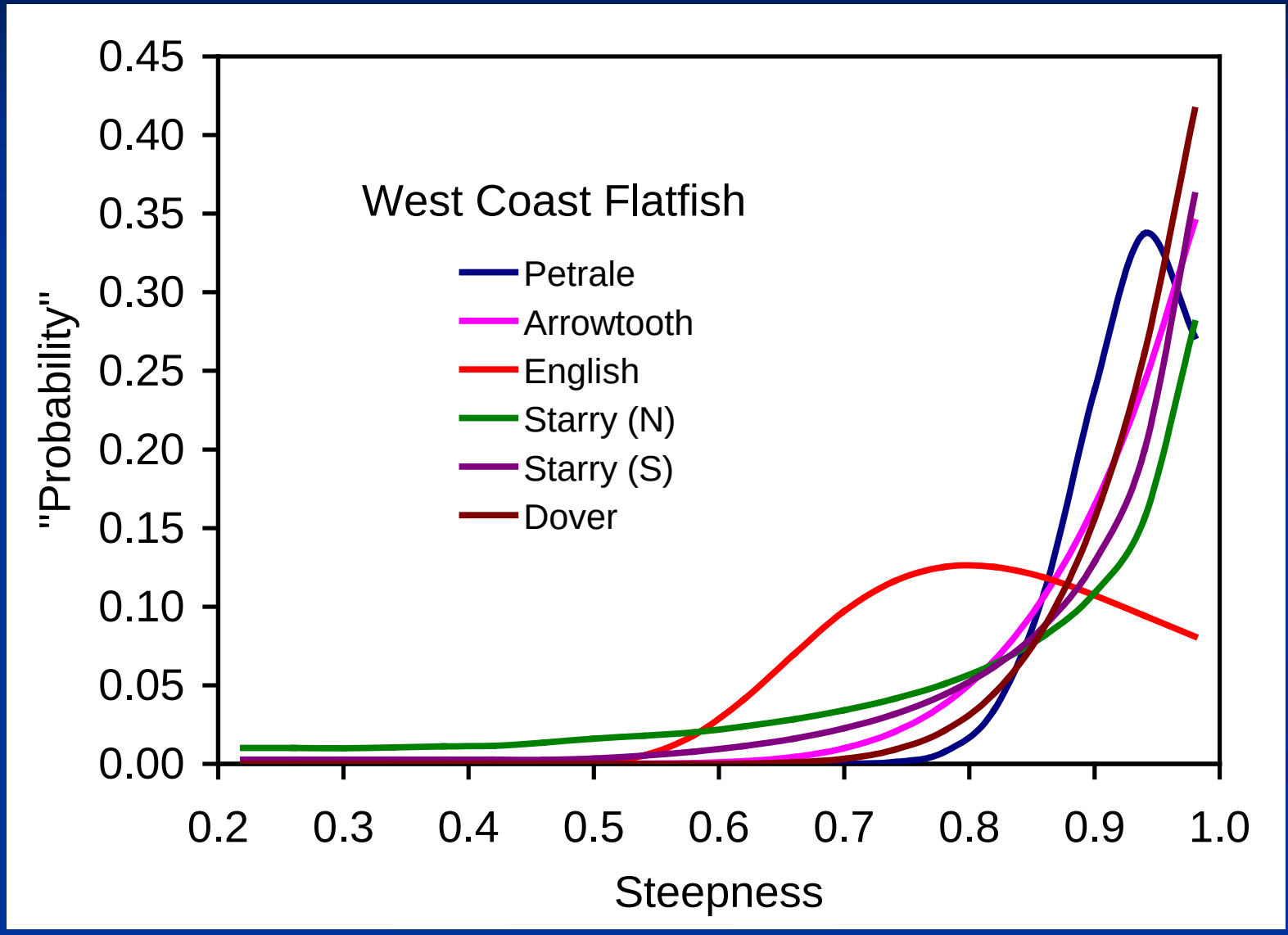
Different Values of "Steepness"



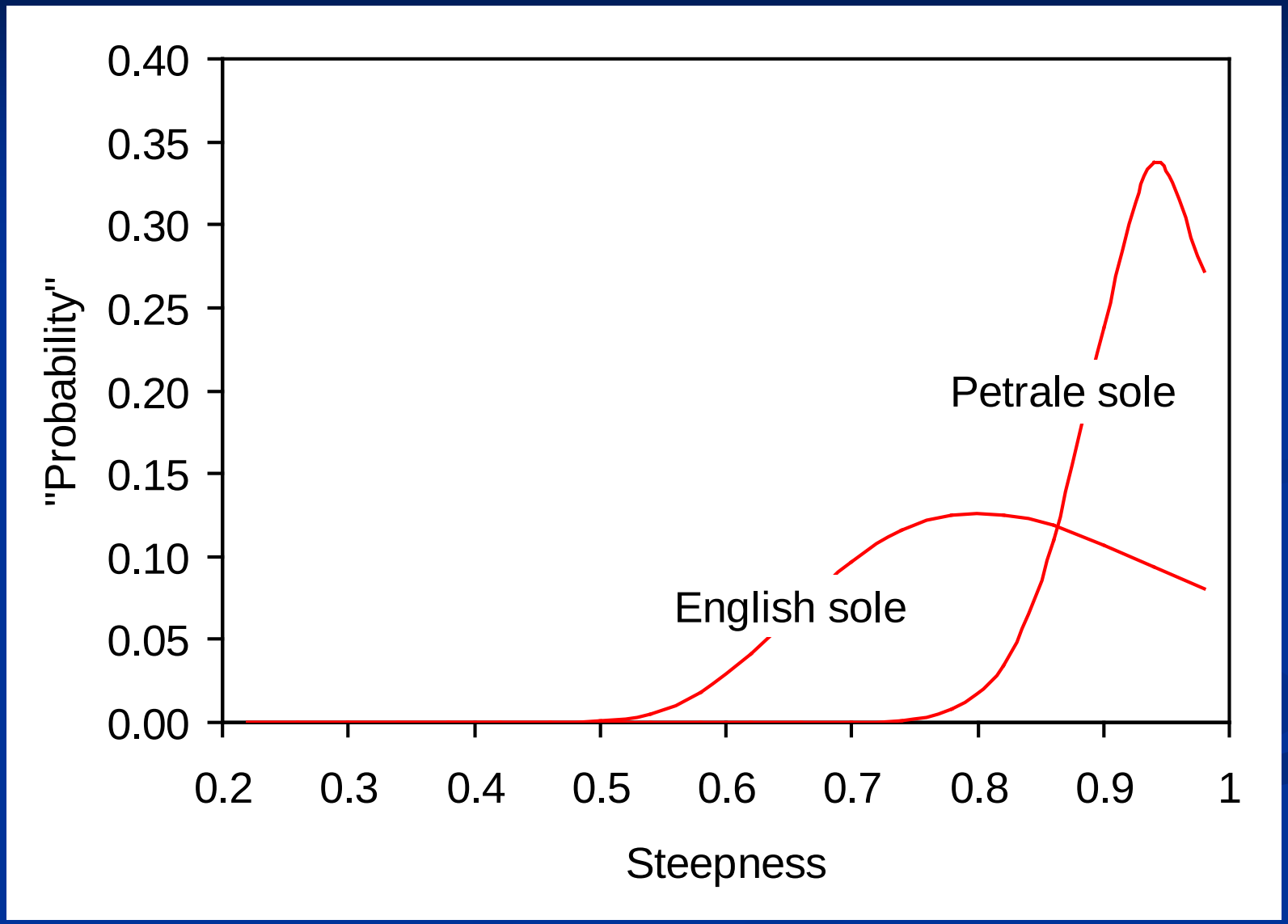
Biologically Implausible Values of "Steepness"

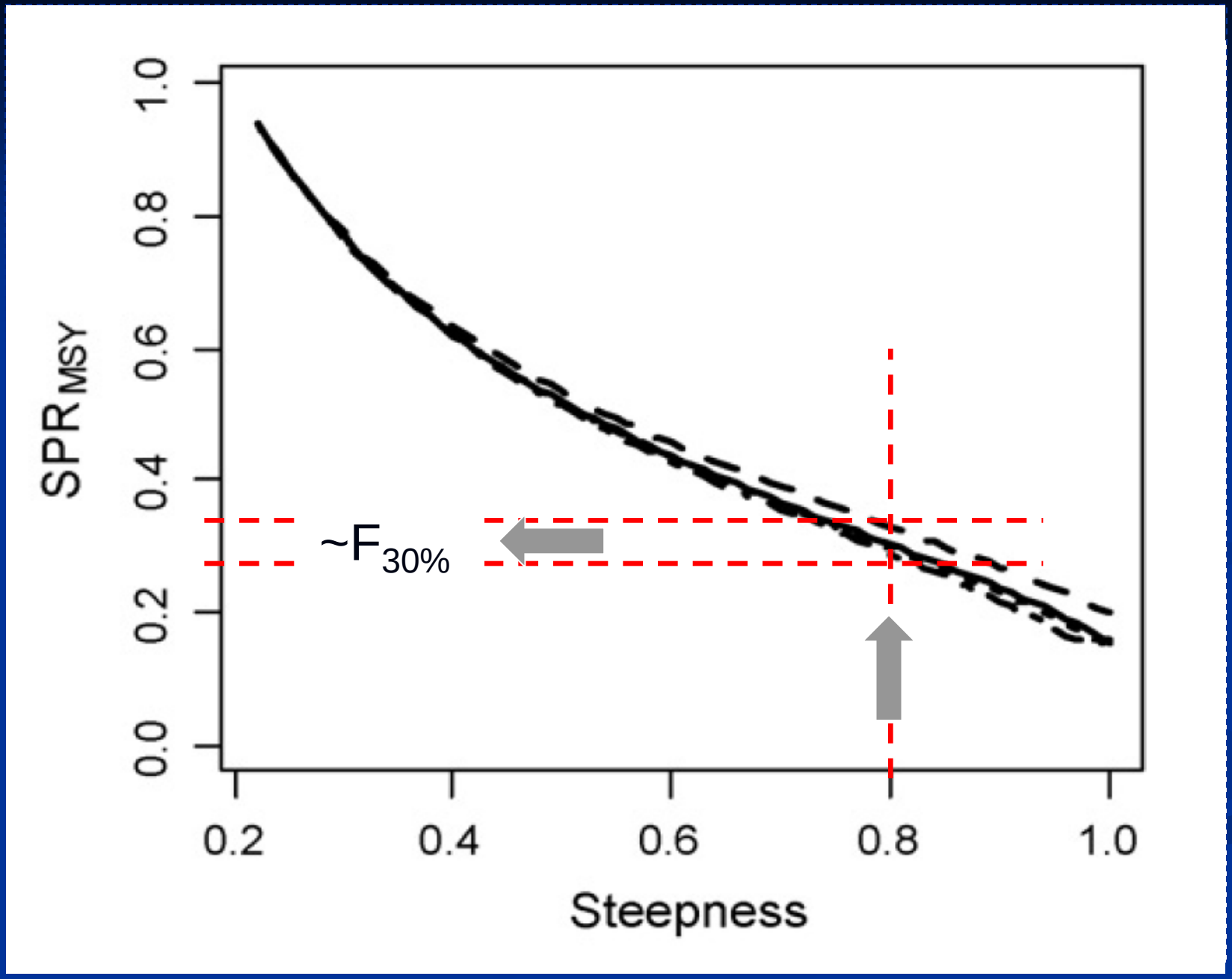


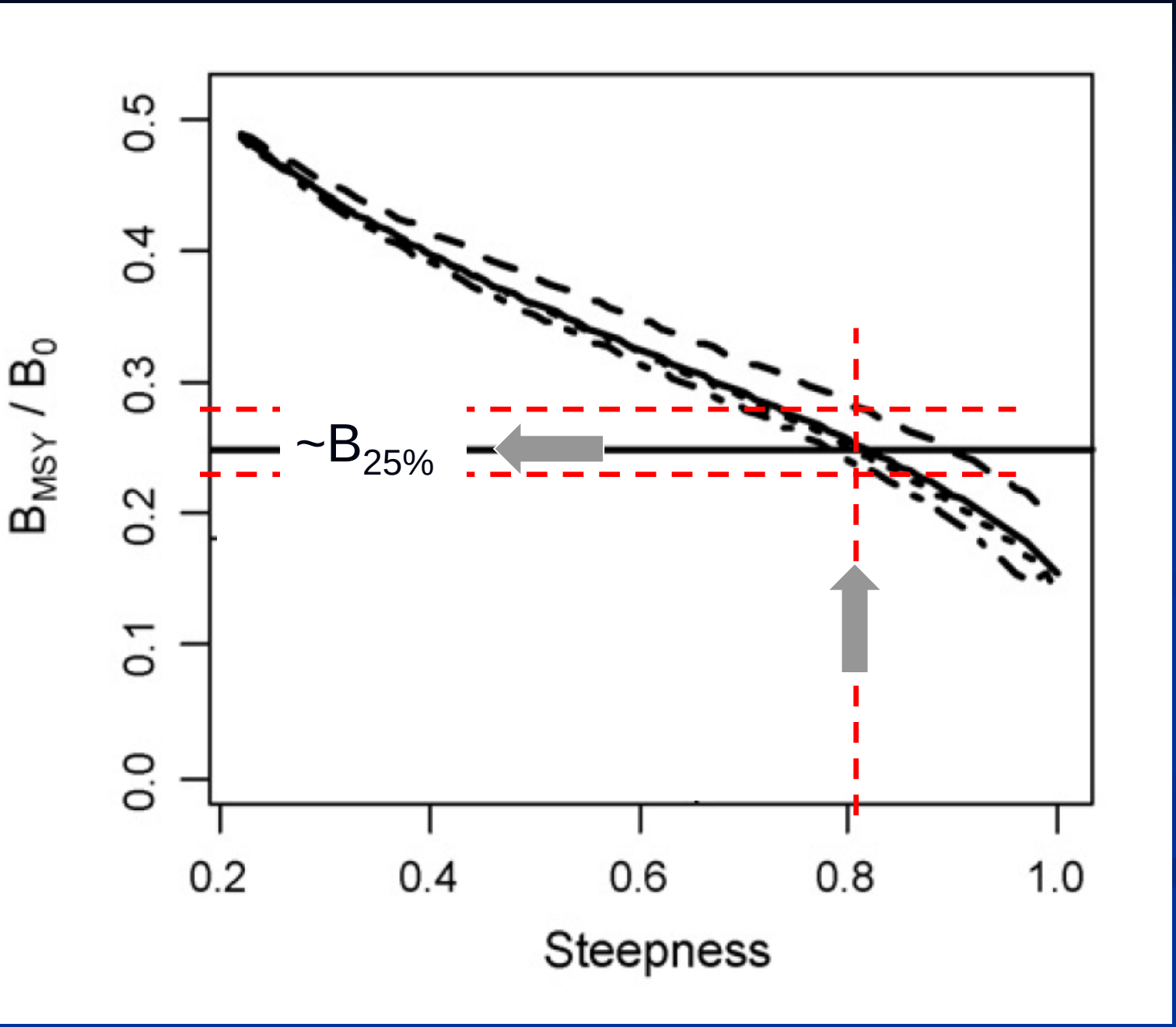
What Do We Think We Know?



Proposed Proxy Flatfish Steepness = 0.8




SPR MSY
0.0
0.2
0.4
0.6
0.8
1.0
~F30%
0.2
0.4
0.6
0.8
1.0
Steepness


B_{MSY} / B_0
0.0
0.1
0.2
0.3
0.4
0.5
~$B_{25\%}$
0.2
0.4
0.6
0.8
1.0
Steepness

Restrepo, V. R, G. G. Thompson, P. M. Mace, W. L. Gabriel, L. L. Low, A. D. MacCall, R. D. Methot, J. E. Powers, B. L. Taylor, P. R. Wade, and J. F. Witzig. 1998. Technical Guidance on the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Technical Memorandum NMFS-F/SPO-31. 54 p.

Proxies for B_{MSY}

The equilibrium biomasses corresponding to the above-mentioned fishing mortality reference points can be used as proxies for B_{MSY}. In addition, B_{MSY} has been approximated by various percentages of the unfished biomass, B_0, usually in the range 30-60% B_0 (higher percentages being used for less resilient species, and lower percentages for more resilient species). Referring (in the preamble) to estimates based on two shapes of production models, the NSGs recommend $0.4B_0$ as a reasonable proxy for B_{MSY}. However, this value may be too low for species with low fecundity such as many species of sharks.

Another class of reference points that has gained prominence are those based on $F_{\%SPR}$. In particular, values in the range $F_{20\%}$ to $F_{30\%}$ have frequently been used to characterize recruitment overfishing thresholds (Rosenberg *et. al.* 1994), while values in the range $F_{30\%}$ to $F_{40\%}$ have been used as proxies for F_{MSY}. These uses are supported by Goodyear (1993); by Mace and Sissenwine (1993), who advocated $F_{20\%}$ as a recruitment overfishing threshold for well-known stocks with at least average resilience and $F_{30\%}$ as a recruitment overfishing threshold for less well-known stocks or those believed to have low resilience; and by Clark (1991; 1993), who advocated $F_{35\%}$ as a robust estimator of F_{MSY} applicable over a wide range of life histories, or $F_{40\%}$ if there is strong serial correlation in recruitment. Note, however, that much of the work on $F_{\%SPR}$ has presupposed a moderate amount of resilience to fishing pressure. Moderate resilience may not be a viable assumption for long-lived species and those with low reproductive output. For example, recent analyses of west coast rockfish (*Sebastes* spp.) stocks are showing the high SPR levels in the range of 50% to 60% are needed to sustain these fisheries (A. MacCall, personal communication). Similar high SPR levels may be necessary to protect many species of sharks and other species that have low productivity.