This is a Petition not a Record Copy (percentile)

Petition to the Alaska Board of Fisheries

I am petitioning the Alaska Board of Fisheries under 5 AAC 96.625 and AS 44.62.220 to review and reject the Department's escapement goal recommendations using the percentile approach, covered in the McKinley at.al., report as most goals are being shifted to the right of MSY,to near Maximum Recruitment, contrary to **5 AAC 39.222. Policy for the management of sustainable salmon fisheries** and **5 AAC 39.223. Policy for statewide salmon escapement goals**. There is a real problem with the Board of Fisheries using the escapement goals as suggested by ADF&G for this UCI meeting as none of them follow the Board's policy or the Department's legal authority. By handing in reports just days from the beginning of the meeting the Board is forced to accept substandard analyses or have nothing to conduct the meeting with or adjudicate proposals. In " **5 AAC 39.223. Policy for statewide salmon escapement goals** *(a) The Department of Fish and Game (department) and the Board of Fisheries (board) are charged with the duty to conserve and develop Alaska's salmon fisheries on the sustained yield principle.* ***Therefore, the establishment of salmon escapement goals is the responsibility of both the board and the department working collaboratively****. The purpose of this policy is to establish the concepts, criteria, and procedures for establishing and modifying salmon escapement goals and to establish a process that facilitates public review of allocative issues associated with escapement goals"*. If the Board adopts these allocative, illegal and unscientific goals they accept ownership and will definitely be challenged on that basis. This weaponization of the escapement goal policy to reallocate fisheries resources by ADF&G is nothing short of **purposeful mismanagement**. Raising escapement goals artificially on one stock to prevent other users or to "control" fishing for other stocks should be stopped immediately. This has been done statewide without any legal authority or notice to the BoF. This escapement goal method is being used on nearly 50 percent of all escapement goals statewide. All of these escapement goal analyses fail to set the current escapement goals in a balanced, scientifically defensible manner. Instead all "SEG's" using the percentile method are being set to 90% of MSY at the lower bound and **70% at the upper bound,** shifting the range to the right robbing the fishing public of 20% of the available yield in good years without any reasonable or legal justification for doing so. When the Percentile Approach was originally developed by Willette and Yanetz in 2001 and reported by Bue and Hasbrouck, these goals were termed SEG's because the Department had no harvest information but did experiment comparing them with known BEG data from other stocks and management areas and this method set goals near MSY but to an unknown level of precision. With the Clark et.al. report, An Evaluation of the Percentile Approach for Establishing Sustainable Escapement Goals in Lieu of Stock Productivity Information, FM#14-06, we now know these goals should be BEG's and could truly approximate a range around 90 percent of MSY. The only stated reason to go to 70% of MSY, raising the goal, is to gain information on stock productivity which 5 AAC 39.223 does not authorize this experiment at the publics expense and since we have no other methodology other than what this report already utilized it can never be evaluated further. Furthermore the Policy states *"BEG will be developed from the* ***best available biological information,***

and should be ***scientifically defensible on the basis of available biological information;*** " no experiments are authorized. In Hilborn and Walters, 1992 they repeatedly caution the reader from this very exercise as the lost yield from the "experiment" will never be recovered. From the graphs on pages 64-72 from Clark et.al., 2014 (attached) you can see that the plots around MSY are skewed at the upper end to maximum recruitment and beyond, looking suspiciously similar to the Optimum Yield Profiles in the report for Susitna River Chinook stocks discussed in a companion petition. In 5 AAC 39.222 the definition of a (BEG) *is "biological escapement goal" or "(BEG)"* ***means the escapement that provides the greatest potential for maximum sustained yield; BEG will be the primary management objective for the escapement unless an optimal escapement or inriver run goal has been adopted;*** *BEG will be developed from the best available biological information, and should be scientifically defensible on the basis of available biological information; BEG will be determined by the department and will be expressed as a range based on factors such as salmon stock productivity and data uncertainty; the department will seek to maintain evenly distributed salmon escapements within the bounds of a BEG;*
(B) salmon escapement goals, whether sustainable escapement goals, biological escapement goals, optimal escapement goals, or inriver run goals, should be established in a manner consistent with sustained yield; unless otherwise directed, the department will manage Alaska's salmon fisheries, to the extent possible, for ***maximum sustained yield;;*** Given this direction in regulation ADF&G has already been told what to do they have just failed to do it. The conversion from a 70% upper bound to a 90% upper bound is simple and rerunning the Percentile Method takes very little time. I have done so in Table 2. On page 9 of the Clark et.al. report they state "Best upper bound percentiles occur most often at 55-65%, not 75% and higher". The current upper bound percentiles are 60-65 percentiles of all escapements which establishes a range of 70% (U70) of MSY, meaning that the true 90 percent of MSY upper bound lies somewhere between 50% and 55%. A simple proportional reduction of the 20 percent difference (90-70=20) is (60*.2=12) so 60-12 is reasonably close to 50. Since the Clark et.al. report adjusted to 90% of MSY on both sides of the range as just discussed creates a BEG that is scientifically defensible on the basis of "*available biological information*" the goals established using the Percentile Approach become BEG's using the definition of BEG quoted above.

The Kasilof River Sockeye Salmon escapement goal is also broadened on both sides of the range without any apparent justification. From the discussion on page 10 of the McKinley et.al, 2019 escapement goal report it states in the second paragraph that the "*recommended escapement goal range was derived from estimates of escapement that provide for 90-100% of maximum sustained yield (MSY)*" only from the graph on page 40 the AR1 Ricker Curve, second from the top, it is readily apparent to the naked eye that the MSY point, vertical line, that yield, dashed curve, is declining significantly prior to this line. Using the method as described by Dr. Bernard for the Alsek River stock on page 13, (attached) it is very obvious that the goal range on page 41 for the AR1 Ricker model is not set to the legal standard of 90 percent of MSY as stated on page 10 of this report. Using the Optimum Yield curve and method described in The Alsek River Chinook

Salmon escapement goal report by Bernard in 2010 it appears the true 90 percent range is 160,000 to 260,000 sockeye.

The Board should reject the goals in McKinley et.al, 2019 using the percentile method, the Kasilof River Sockeye goal range and Susitna Chinook Salmon goals in Reimer and Decovich except the Deshka River Chinook covered in a companion petition needs to have the range centered on 90% of MSY. These percentile method goals should be replaced with the L90-U90% goals in Table 2 (attached) which also includes goals ADF&G failed to review as well as some they did incorrectly. The Kasilof River Sockeye escapement goal range should be set at 90% of MSY from the second profile from the top on page 40, it appears to be about 160,000 to 260,000, suspiciously close to what the goal of 150,000 to 250,000 was before all of these "science based" mathematical model analyses started back 20 years ago. How much yield has been lost from this experiment? The Deshka River goal should be established as a L90-U90% goal of approximately 10,000 to 15,000 even though the range is narrower and may be harder to hit. None of this work would take more than a few minutes for ADF&G to complete and then the goals would be allocatively neutral and be legally compliant.

Jeff Fox

Soldotna

Table 2. Summary of current escapement goals and recommendede escapement goals for stocks in Upper Cook Inlet, 2019.

(Replacement for escapement goal Table 2, done by McKinley et.al. 2019)

	Current escapement goal			Recommended escapement goal				
System	Goal	Type	Year Adopted	Range	Type	Data	Action	Tier
Chinook Salmon								
Talachulitna River	2,200-5,000	SEG	2002	2,100-3,000	BEG	SAS	NEW	T1
Lake Cr.	2,500-7,100	SEG	2002	1,600-3,800	BEG	SAS	NEW	T3
Peters Cr.	1,000-2,600	SEG	2002	1,000-1,500	BEG	SAS	NEW	T1
Deshka River	13,000-28,000	SEG	2011	~10,000-15,000	BEG	Wier	NEW	
Clear Cr.	950-3,400	SEG	2002	950-1,550	BEG	SAS	NEW	T1
Prarie Cr.	3,100-9,200	SEG	2002	2,900-3,900	BEG	SAS	NEW	T1
Goose Cr.	250-650	SEG	2002	100-300	BEG	SAS	NEW	T1
Little Willow Cr.	450-1,800	SEG	2002	700-900	BEG	SAS	NEW	T1
Montana Cr.	1,100-3,100	SEG	2002	900-1,450	BEG	SAS	NEW	T1
Sheep Cr.	600-1,200	SEG	2002	350-750	BEG	SAS	NEW	T1
Willow Cr.	1,600-2,800	SEG	2002	1,150-2,000	BEG	SAS	NEW	T1
Chulitna R.	1,800-5,100	SEG	2002	1,150-2,550	BEG	SAS	NEW	T3
Alexander Cr.	2,100-6,000	SEG	2002	200-2,300	BEG	SAS	NEW	T1
Lewis R.	250-800	SEG	2002	Discontinue				T1
Chuitna R.	1,200-2,900	SEG	2002	950-1,400	BEG	SAS	NEW	T1
Theordore R.	500-1,700	SEG	2002	350-650	BEG	SAS	NEW	T1
Little Su weir	2,300-3,900	SEG	2017	2,450-3,650	BEG	SAS	NEW	T3
Little Su. aerial	900-1,800	SEG	2002	600-1,300	BEG	SAS	NEW	T3
Canbpell Cr.	300	SEG	2011					
Crooked Cr.	650-1,700	SEG	2002	650-1,100	BEG	Weir	NEW	T3
Kenai R. early		SEG	2017					
Kenai R. late		SEG	2017					
Chum Salmon								
Clearwater Cr.	3,500-8,000	SEG	2017	3,500-6,250	BEG	PAS	NEW	T1
Coho Salmon								
Deshka R.	10,200-24,100	SEG	2017	7,150-12,750	BEG	Weir	NEW	T2
Fish Cr.	1,200-4,400	SEG	2011	1,250-5,100	BEG	Weir	NEW	T2
Jim Cr.	450-1,400	SEG	2014	250-650	BEG	SFS	NEW	T2
Little Susitna R.	10,100-17,700	SEG	2002	9,150-15,850	BEG	Weir	NEW	T2
Sockeye Salmon								
Chelatna Lake	20,000-45,000	SEG	2017	19,450-28,500	BEG	Weir	NEW	T2
Judd Lake	15,000-40,000	SEG	2017	16,600-38,300	BEG	Weir	NEW	T2
Larson Lake	15,000-35,000	SEG	2017	17,600-37,900	BEG	Weir	NEW	T2
Fish Cr.	15,000-45,000	SEG	2017	8,500-20,500	BEG	Weir	NEW	T2
Packers Cr.	15,000-30,000	SEG	2008	17,750-22,300	BEG	Weir/Video	NEW	T1
Kasilof River	160,000-340,000	BEG	2011	~160,000-260,000	BEG	Sonar	NEW	S/R
Kenai River	700,000-1,200,000	BEG	2011	600,000-800,000	BEG	Sonar	NEW	S/R

T1 ADF&G 20th to 60 percentile
T2 ADF&G 15th to 65 percentile
T3 ADF&G 5th to 65 percentile

T1 Adjusted for L90-U90 (MSY) Clark-2014 20th to 60 percentile
T2 Adjusted for L90-U90 (MSY) Clark-2014 20th to 50 percentile
T1 Adjusted for L90-U90 (MSY) Clark-2014 5th to 55 percentile

Alexander Cr. Chinook goal reset using all data that replaced themselves, not just high escapement counts
Deshka River Coho goal redone using Clark 3 tiers adjusted to L90-U90 (MSY)
Deshka River Chinook goal redone uing method from companion Petition (MSY)

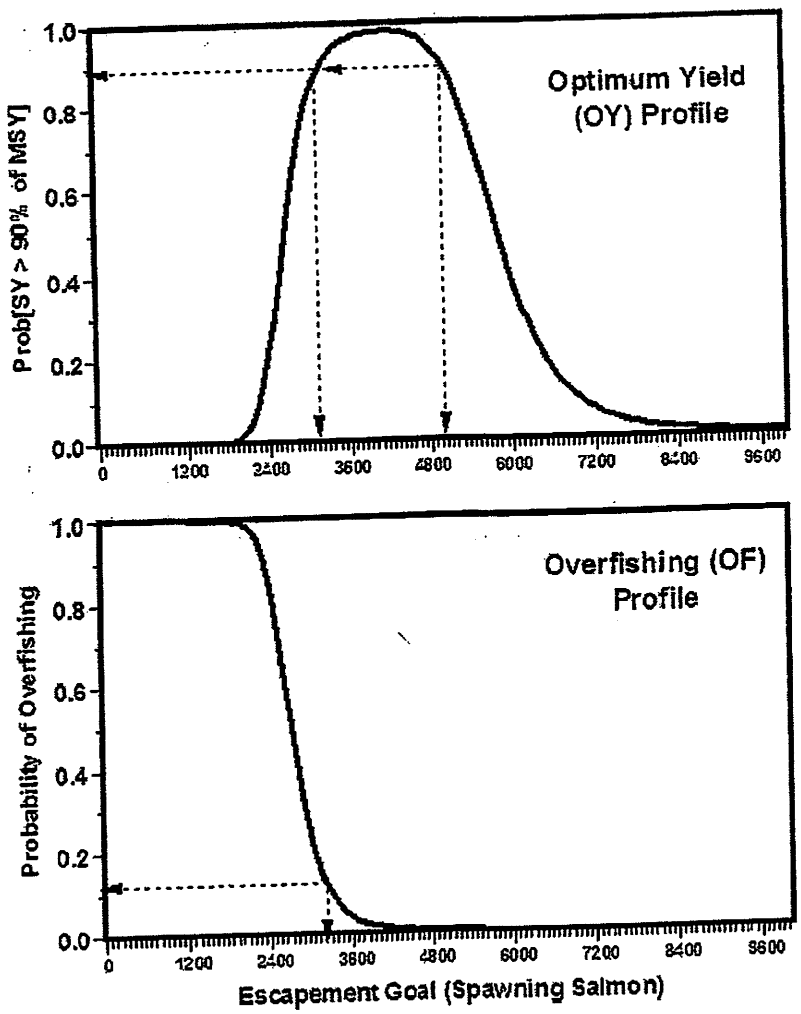
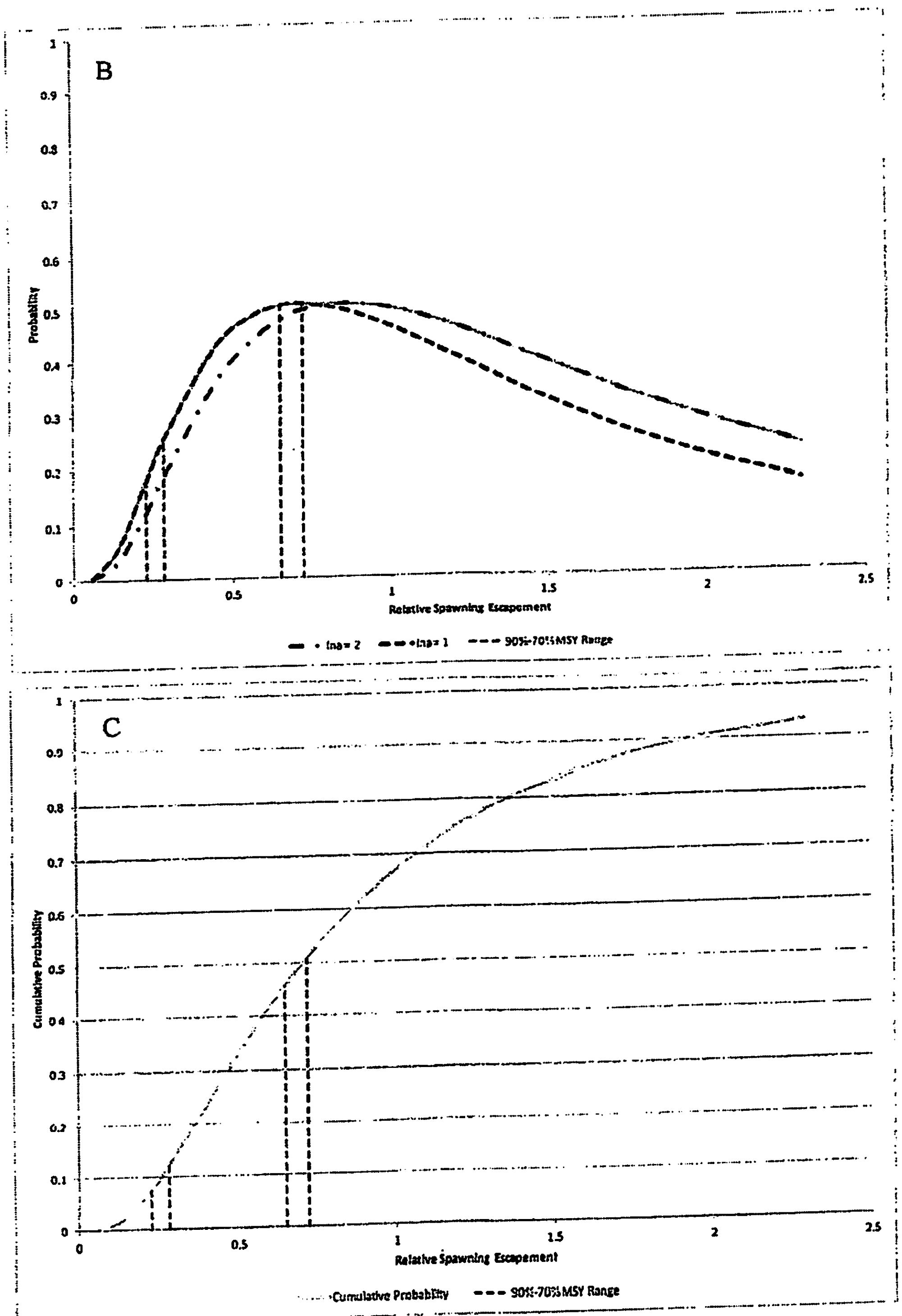
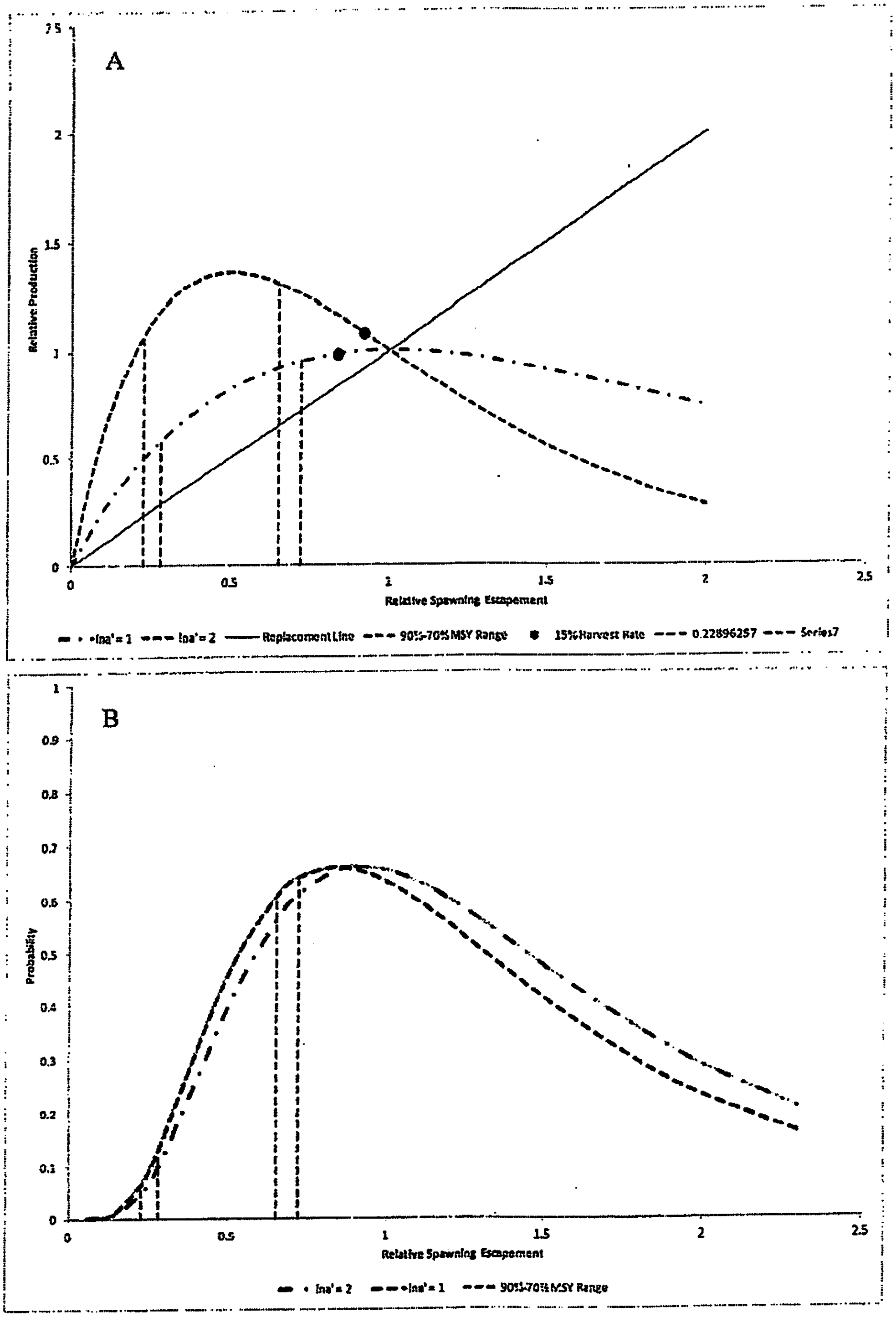


Figure 6.–Examples of optimum yield (OY) and overfishing (OF) profiles. Optimum yield for both types of profiles is a sustained yield ≥90% of MSY. Dashed lines on the OY profile connect the chance of attaining OY with a specific escapement as a goal; or on the OF profile, connect the probability of having less than optimum yield through recruitment overfishing at that escapement.

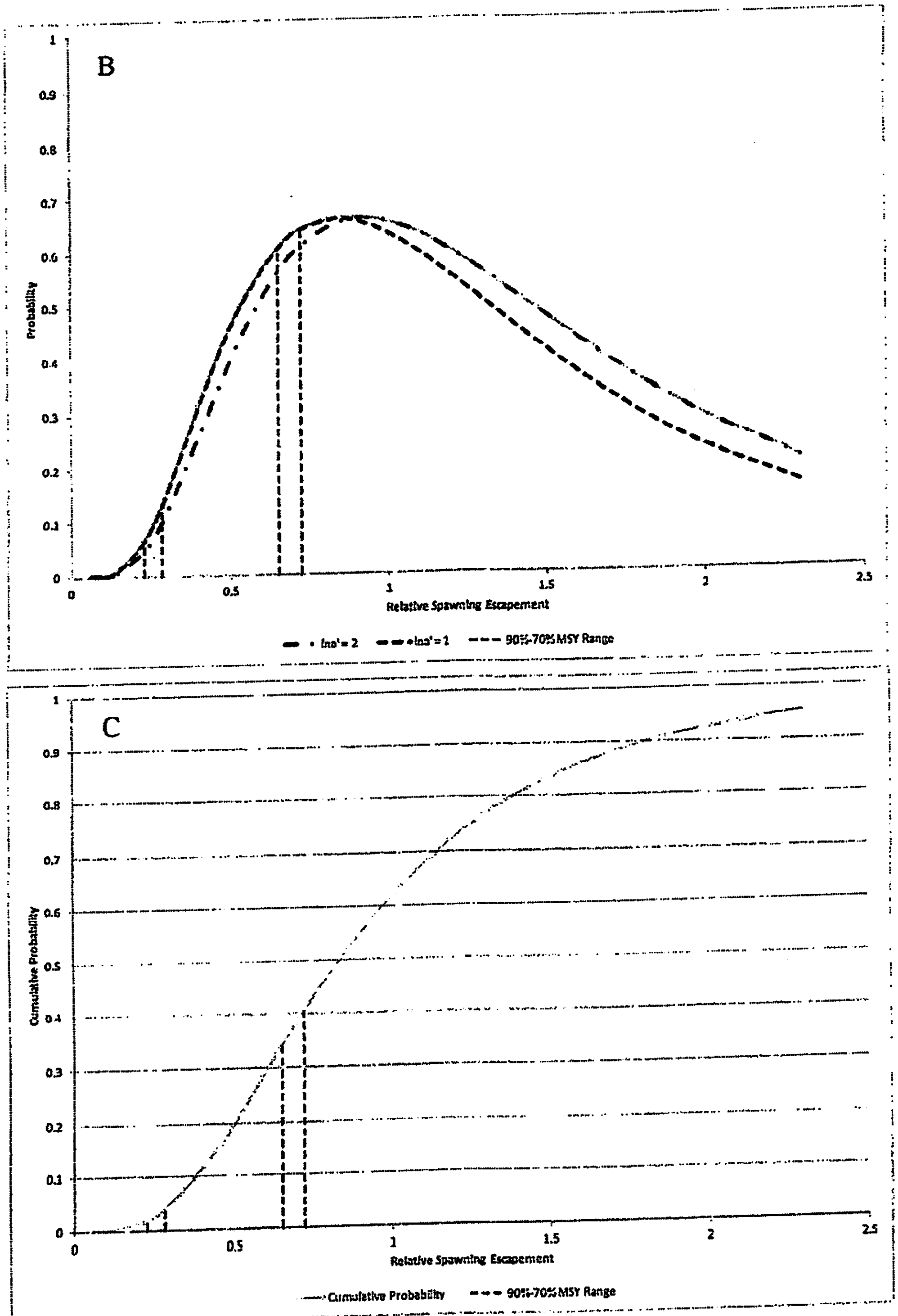
4 and Figure 7 represent these and other descriptive statistics for variables and parameters given that an informative prior was used for $\ln\alpha$. The median value of MSY from its posterior distribution is 5,917 adults. The expected value for the average of spawning escapements (a variable) over years 1976–2007 (9,804) compares favorably with the average (9,816) of estimated escapements (an observation). These values also compare favorably to the expected value of 11,920 for carrying capacity (the variable S_{EQ}) given that estimated annual harvest rates on this stock have an average of 12% across the years). The posterior distribution for the parameter ϕ indicates some probability of negligibly positive autocorrelation in process error. A plot of the expected P vs. S from posterior distributions embedded within possible plots from MCMC samples (Figure 8) graphically confirm a moderate amount of uncertainty in parameter



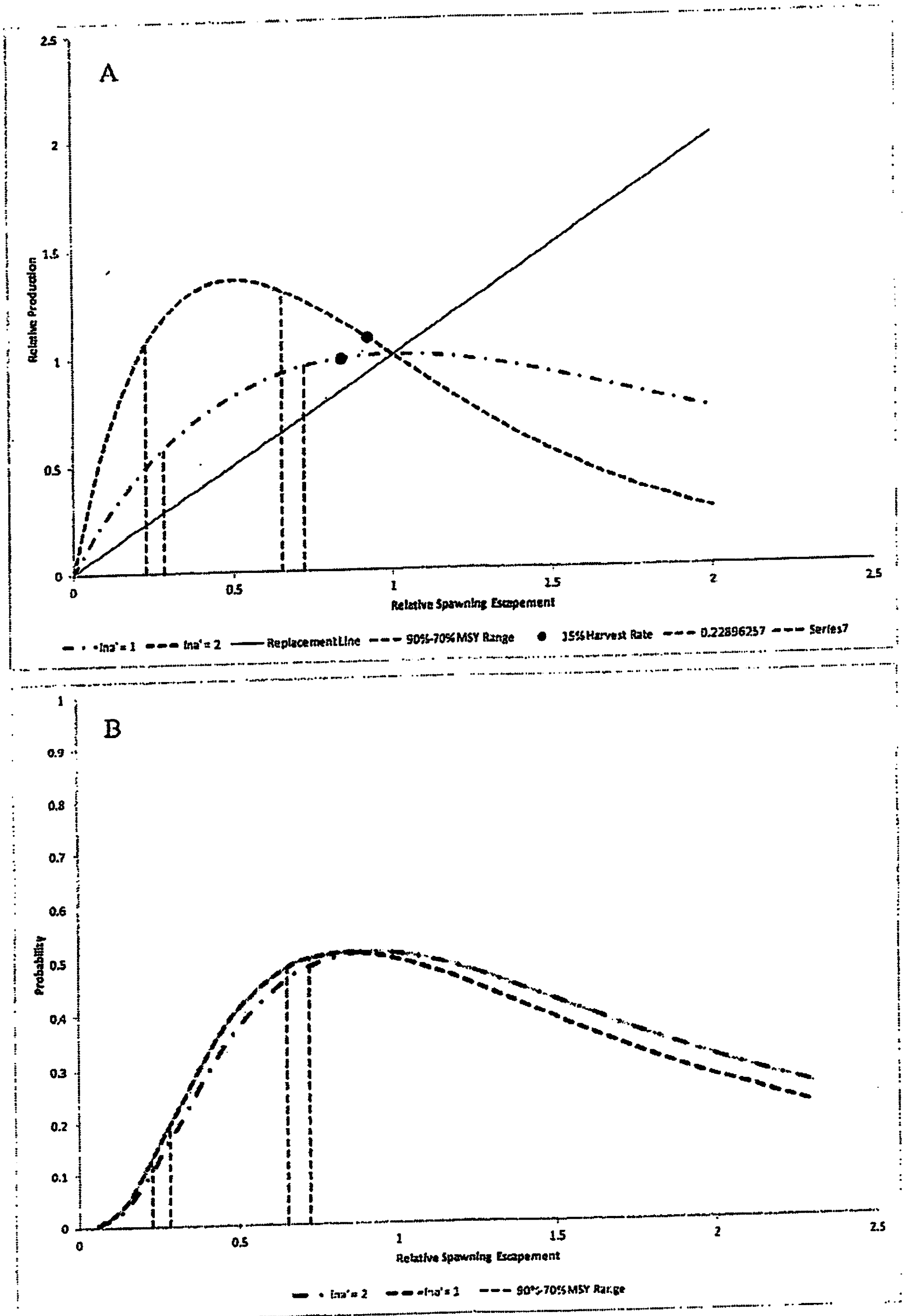
Appendix D1.–Page 2 of 2. Panel C: the combined cumulative distribution (solid curve) of the 2 theoretical log-normal distributions in Panel B and the same L90 and U70 lines (vertical dashed lines) from Panel A. Results are for the fixed harvest rate of 0.25 and high measurement error (σ_S = 0. 50) scenario.



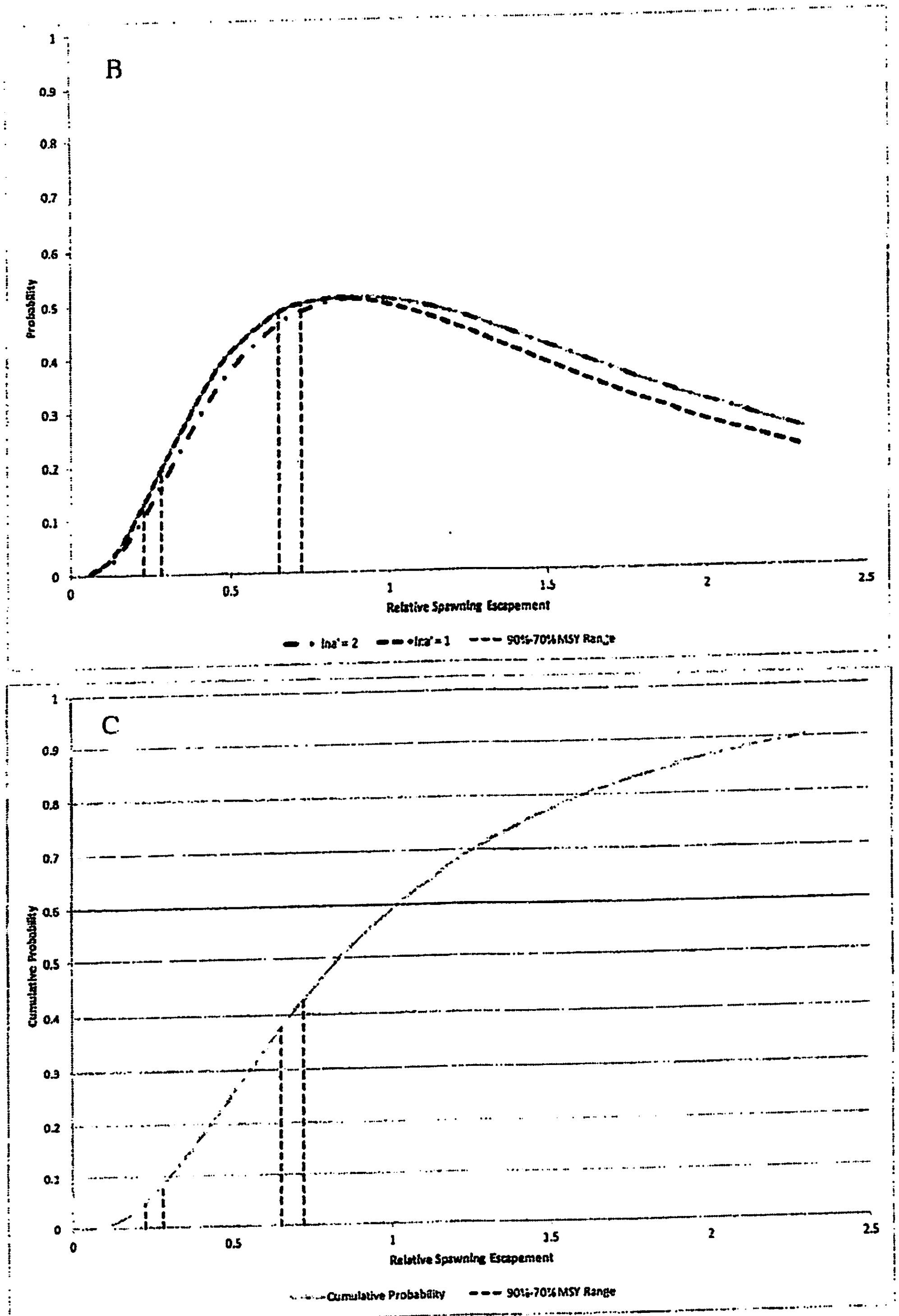
Appendix D2.–Panel A: 2 hypothetical stock-recruitment relationships (dashed curves), the L90 and U70 lines (vertical dashed lines) for each relationship, and equilibrium points (black circles) based on a fixed harvest rate of 0.15. Panel B: 2 hypothetical log-normal distributions (dashed curves) around the 2 equilibrium spawning escapements from Panel A and the same L90 and U70 lines from Panel A.



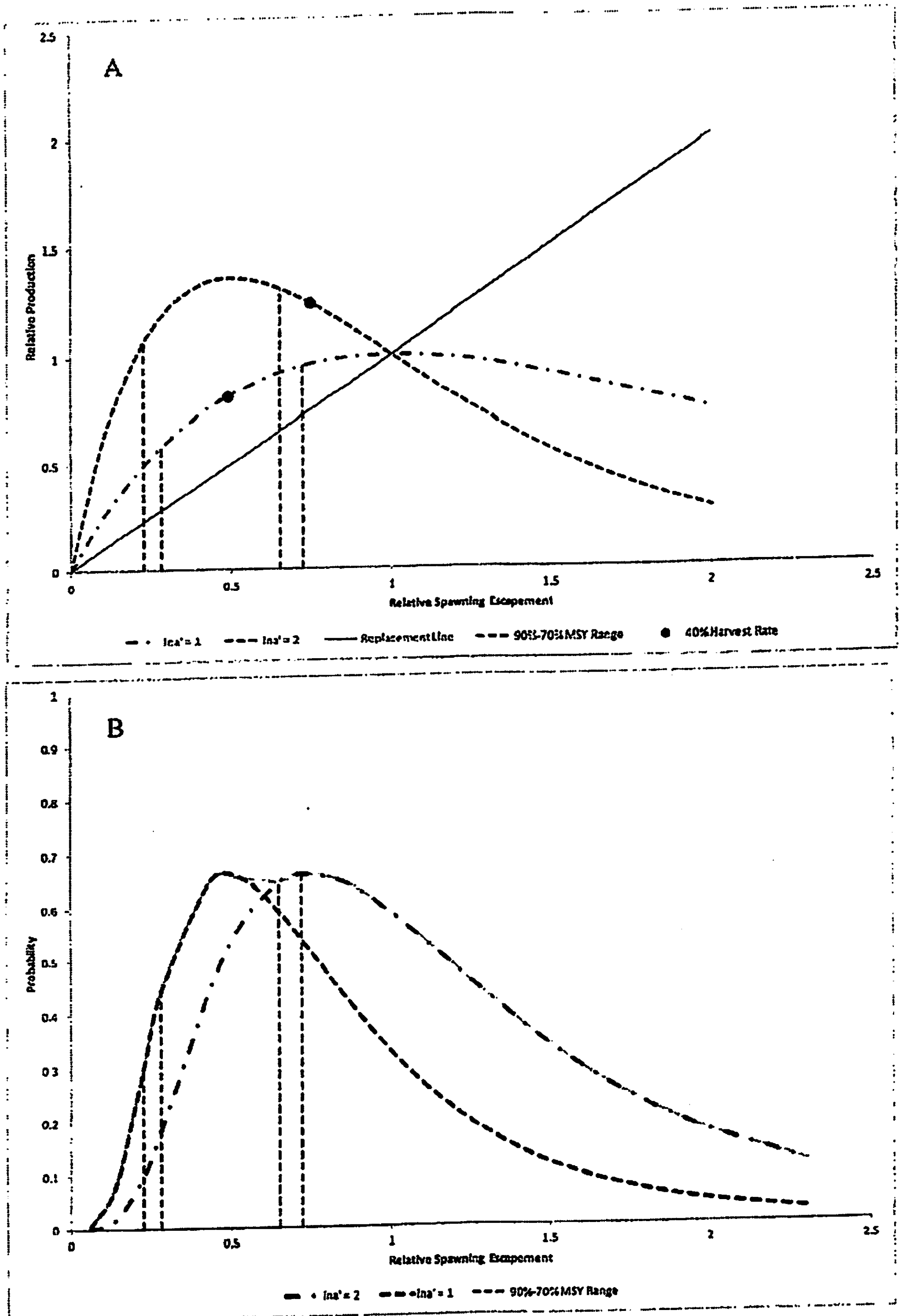
Appendix D2.–Page 2 of 2. Panel C: the combined cumulative distribution (solid curve) of the 2 theoretical log-normal distributions in Panel B and the same L90 and U70 lines (vertical dashed lines) from Panel A. Results are for the fixed harvest rate of 0.15 and low measurement error (σ_S = 0.05) scenario.



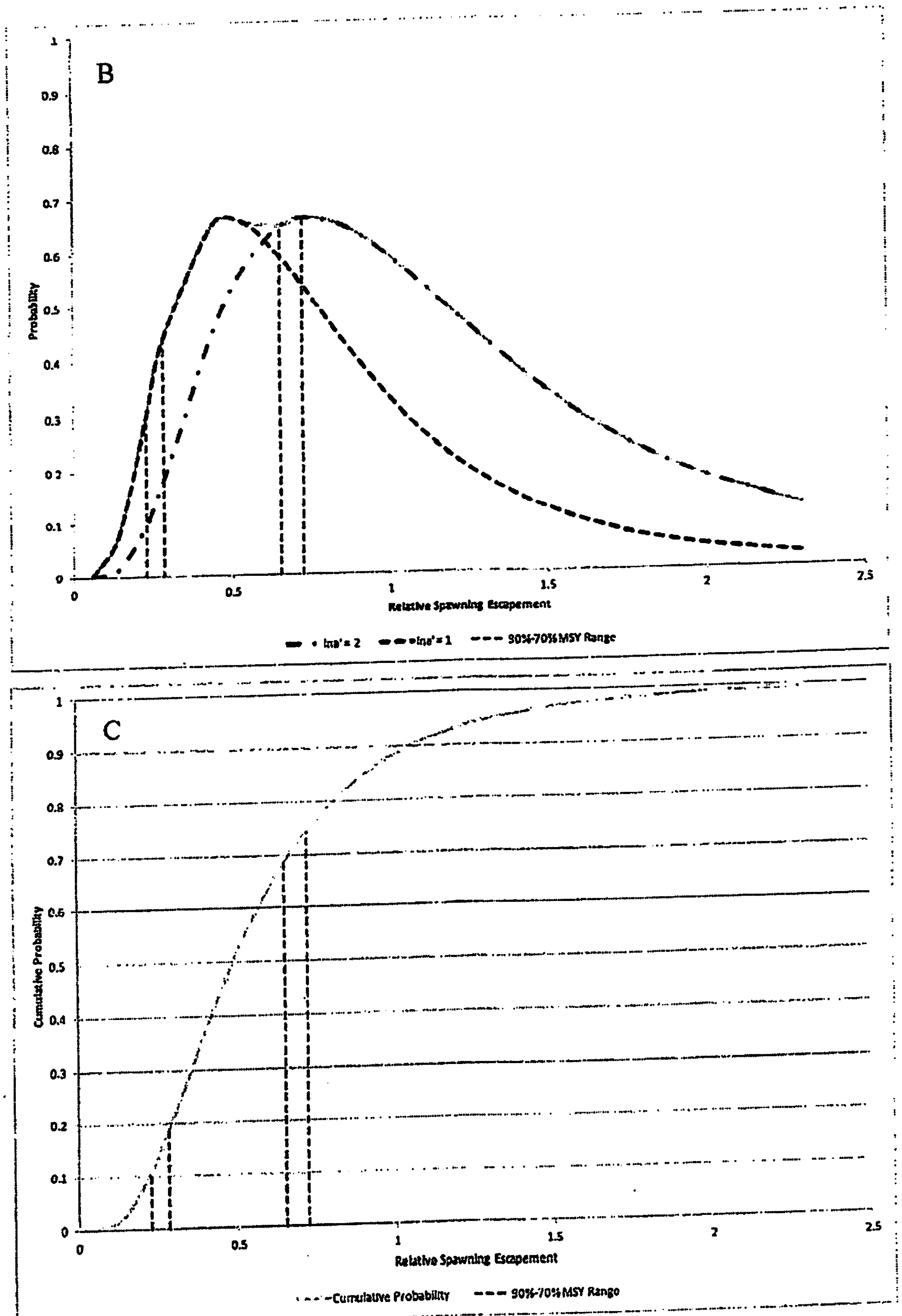
Appendix D3.–Panel A: 2 hypothetical stock-recruitment relationships (dashed curves), the L90 and U70 lines (vertical dashed lines) for each relationship, and equilibrium points (black circles) based on a fixed harvest rate of 0.15. Panel B: 2 hypothetical log-normal distributions (dashed curves) around the 2 equilibrium spawning escapements from Panel A and the same L90 and U70 lines from Panel A.



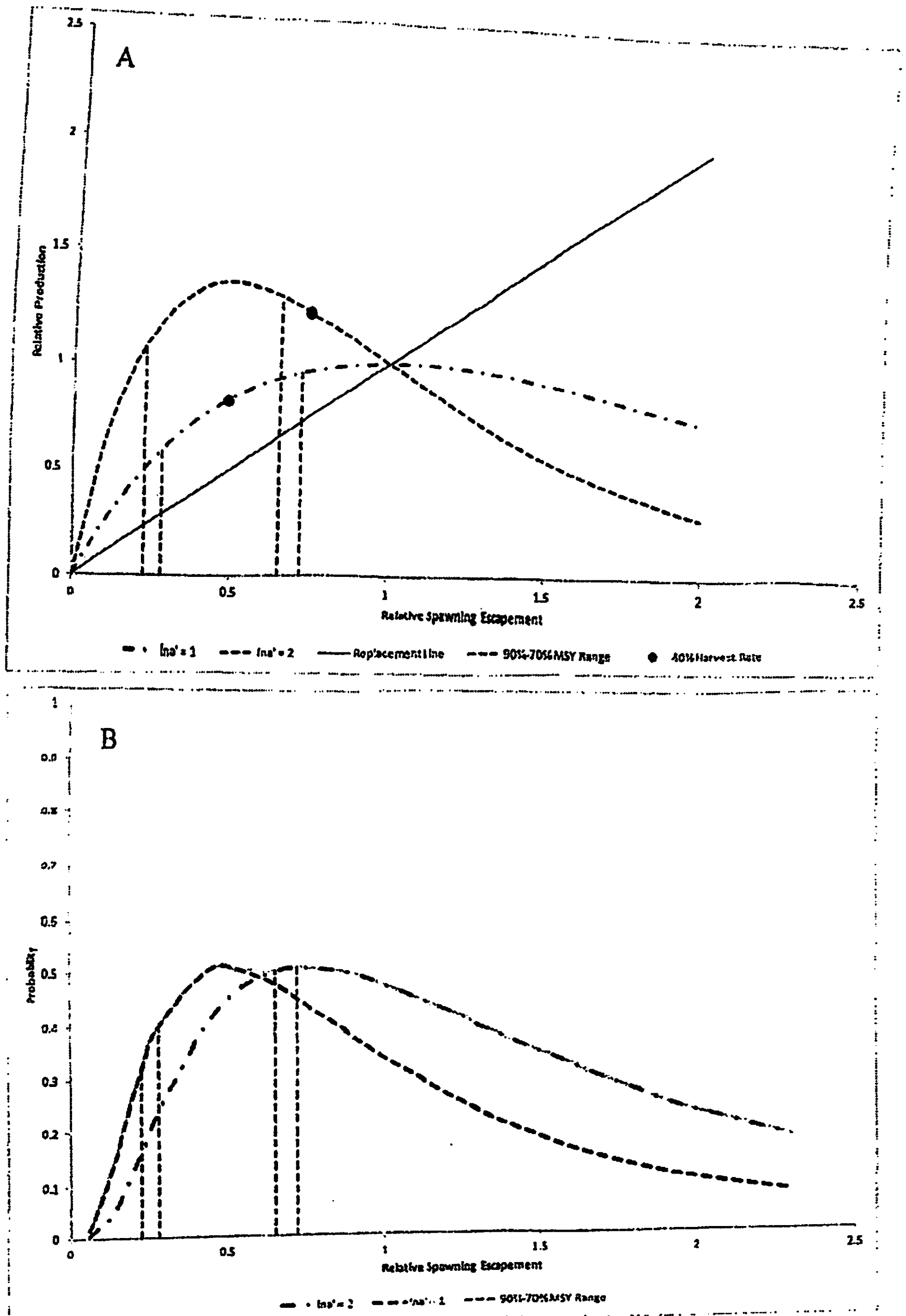
Appendix D3.–Page 2 of 2. Panel C: the combined cumulative distribution (solid curve) of the 2 theoretical log-normal distributions in Panel B and the same L90 and U70 lines (vertical dashed lines) from Panel A. Results are for the fixed harvest rate of 0.15 and high measurement error (σ_S = 0.50) scenario.



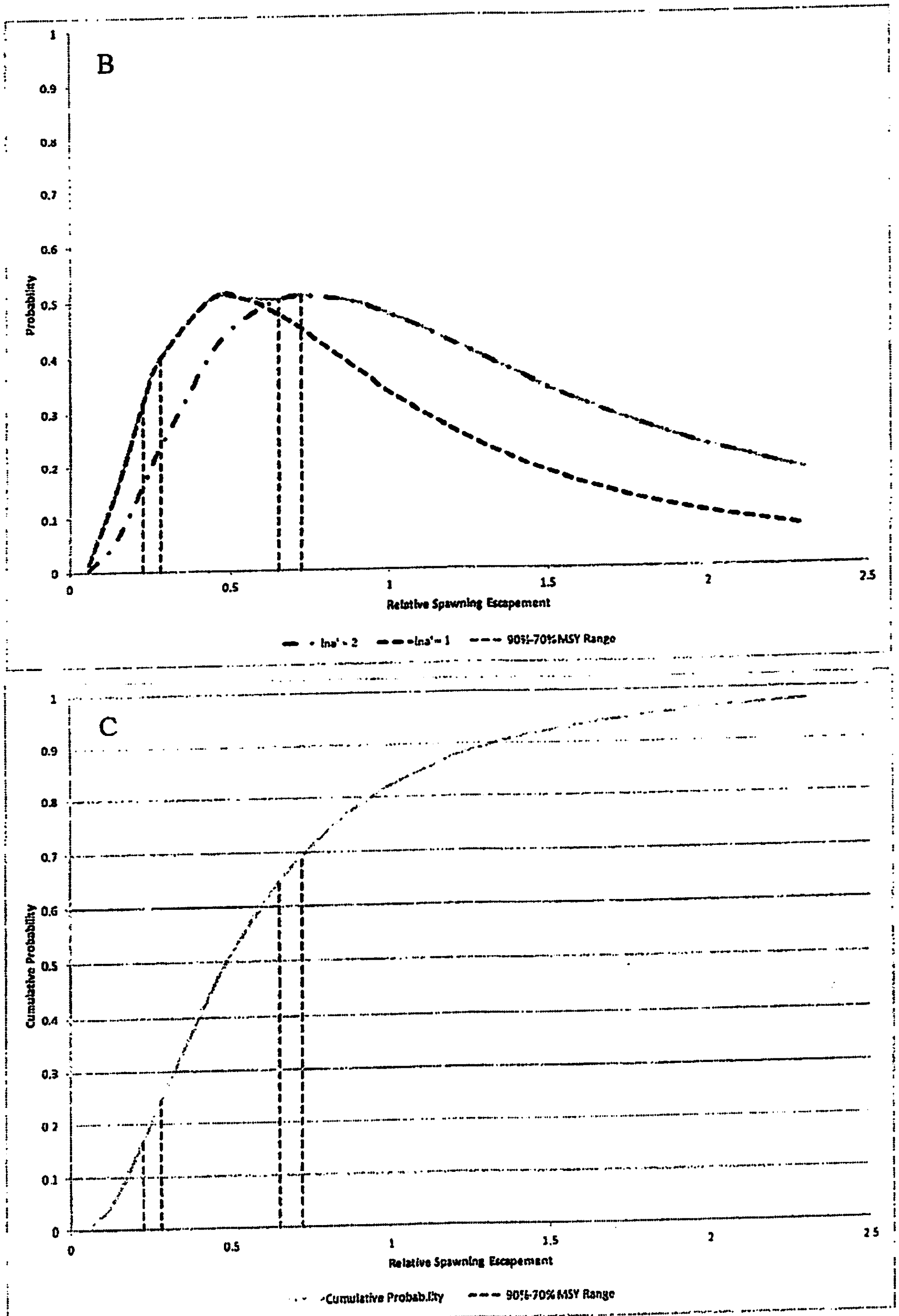
Appendix D4.–Panel A: 2 hypothetical stock-recruitment relationships (dashed curves), the L90 and U70 lines (vertical dashed lines) for each relationship, and equilibrium points (black circles) based on a fixed harvest rate of 0.40. Panel B: 2 hypothetical log-normal distributions (dashed curves) around the 2 equilibrium spawning escapements from Panel A and the same L90 and U70 lines from Panel A.



Appendix D4.–Page 2 of 2. Panel C: the combined cumulative distribution (solid curve) of the 2 theoretical log-normal distributions in Panel B and the same L90 and U70 lines (vertical dashed lines) from Panel A. Results are for the fixed harvest rate of 0.40 and low measurement error ($\sigma_S = 0.05$) scenario.



Appendix D5.–Panel A: 2 hypothetical stock-recruitment relationships (dashed curves), the L90 and U70 lines (vertical dashed lines) for each relationship, and equilibrium points (black circles) based on a fixed harvest rate of 0.40. Panel B: 2 hypothetical log-normal distributions (dashed curves) around the 2 equilibrium spawning escapements from Panel A and the same L90 and U70 lines from Panel A.



Appendix D5.–Page 2 of 2. Panel C: the combined cumulative distribution (solid curve) of the 2 theoretical log-normal distributions in Panel B and the same L90 and U70 lines (vertical dashed lines) from Panel A. Results are for the fixed harvest rate of 0.40 and high measurement error (σ_S = 0.50) scenario.

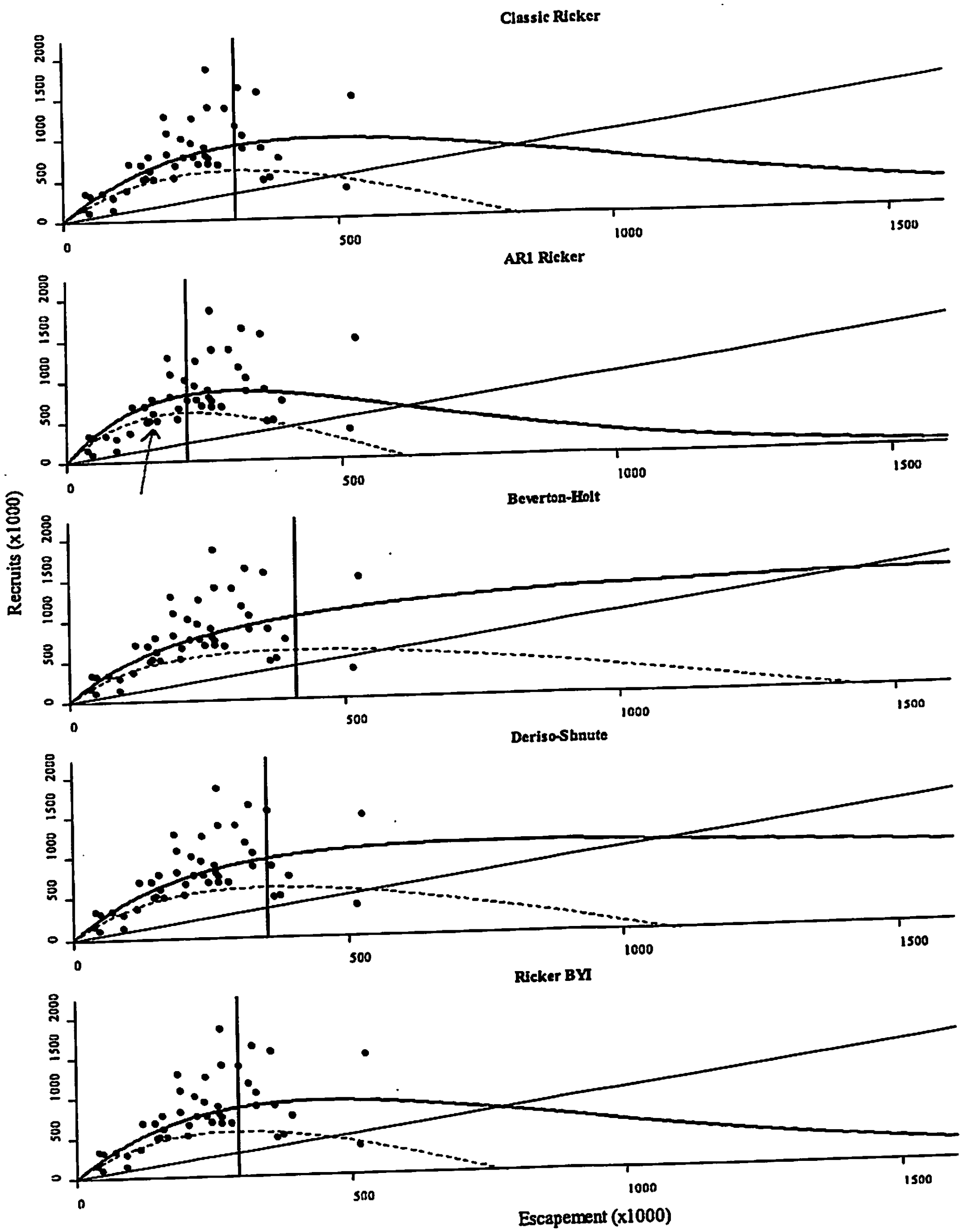


Figure 7.–Spawner-recruit models fit to Kasilof River sockeye salmon return per spawner data, brood years 1968–2012.

Note: The solid lines indicate model-predicted adult returns and the dashed lines indicate predicted yields. Vertical lines identify S_{MSY} for each model.

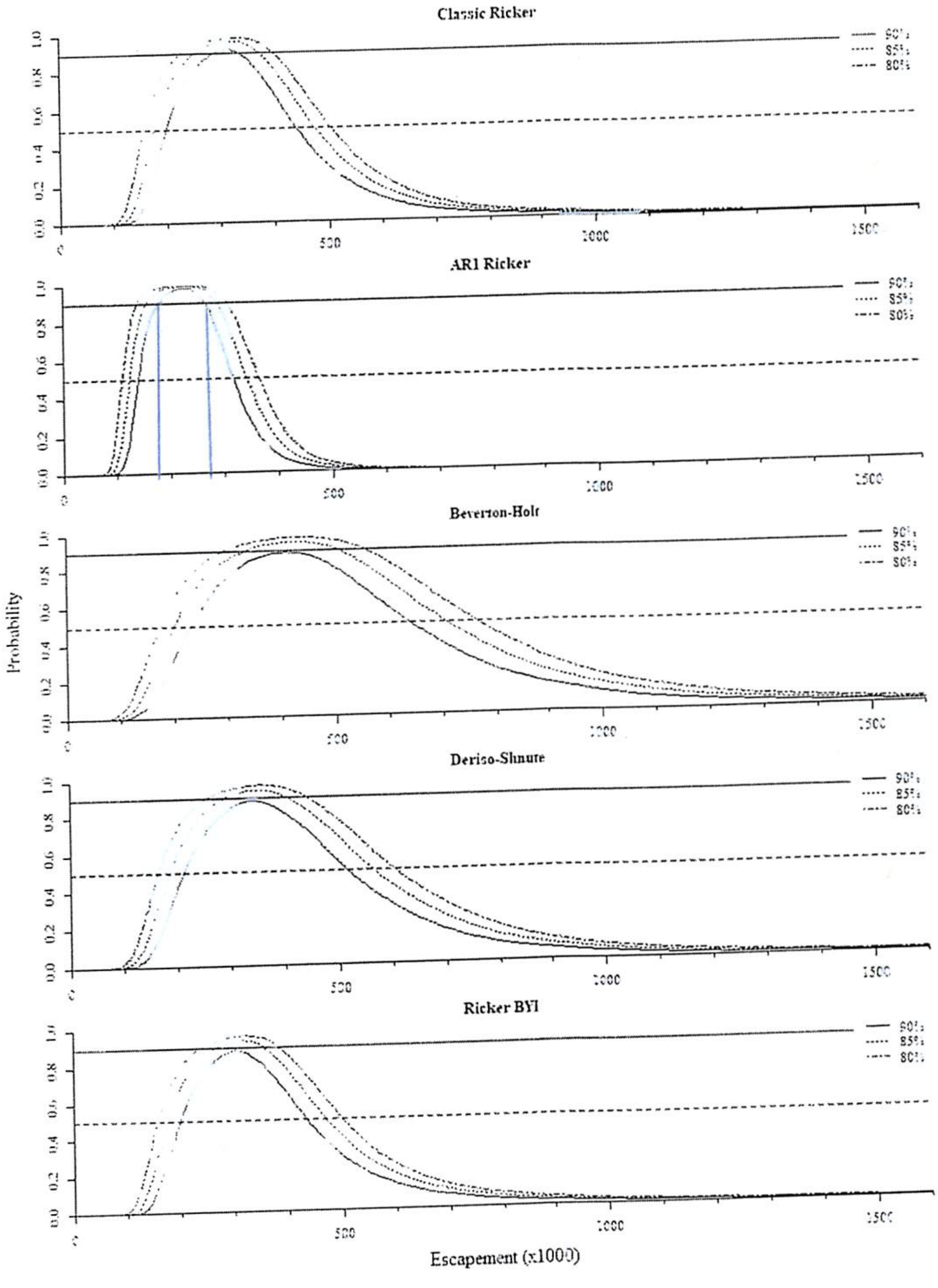


Figure 8.–Optimum yield profiles for Kasilof River sockeye salmon.

Note: Profiles show the probability that a specified spawning abundance will result specified fractions (80%, 85%, and 90% lines) of maximum sustained yield for 5 spawner-recruit models fit to data from brood years 1968–2012. Shaded ranges represent the recommended escapement goal (140,000–320,000).