

Science, Service, Stewardship



Yellowedge Grouper stochastic SRA

SEDAR 22

Review Workshop

February 14-17, 2011

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**NOAA
FISHERIES
SERVICE**



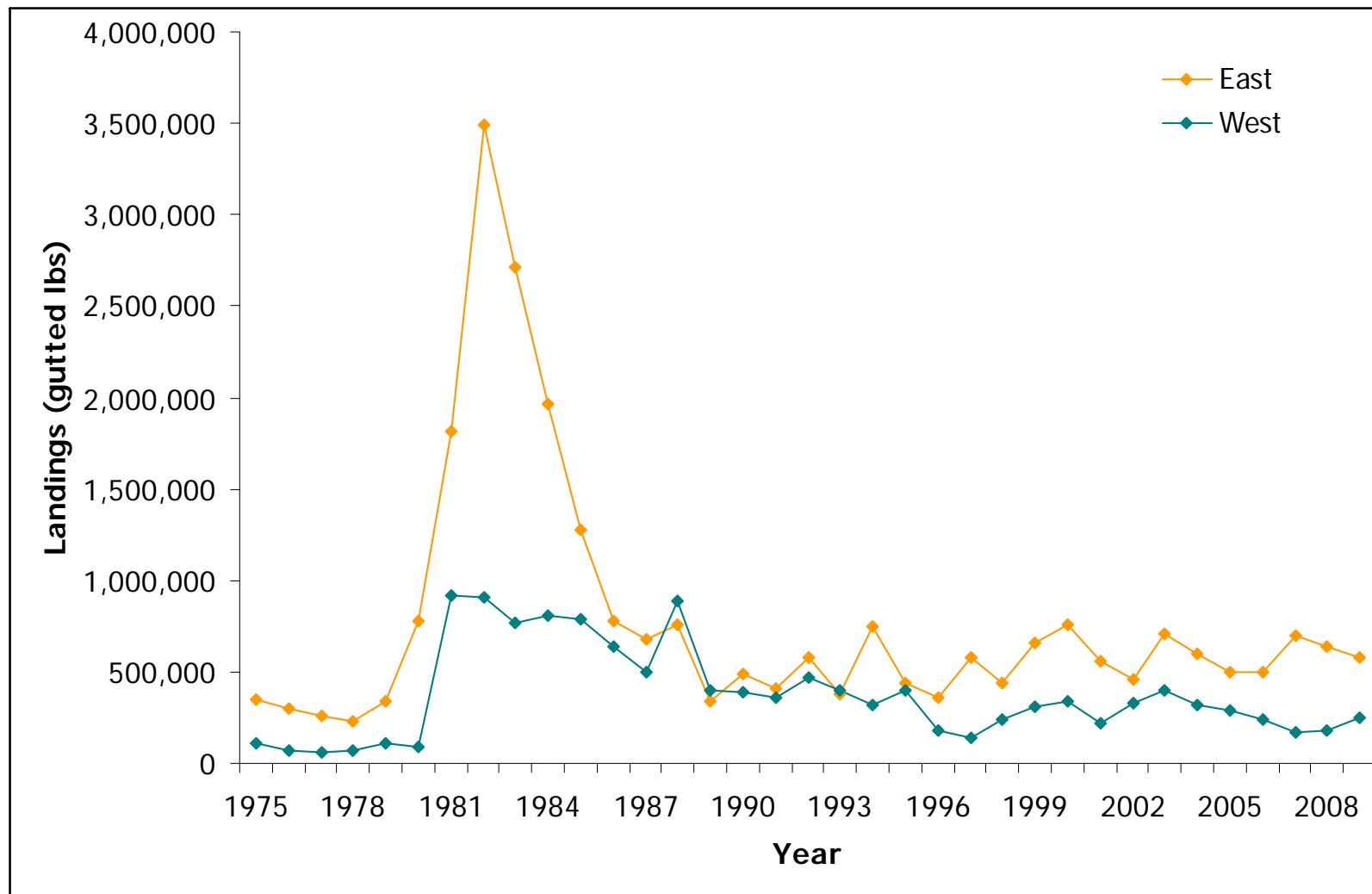
Review Models & Inputs:

- Gulf of Mexico and by regions (East and West of MS river)
- Catch history – all commercial landings
- Age vulnerabilities from SS base model (23.1)
- Indices: CMLL with varying degrees of uncertainties

Data Inputs:

Parameter	Definition	All	East	West
# ages	Number of age classes	85	85	85
Bhat 2009	Biomass in the last year	6.0E+06	6.0E+06	6.0E+06
SD Bhat	Standard Deviation Bhat	1.0E+08	1.0E+08	1.0E+08
Uhat 2009	Exploitation for the last year	0.10	0.10	0.10
SD Uhat	Standard Deviation of Uhat	0.02	0.02	0.02
SD rec	Standard Deviation of RecK	0.50	0.50	0.50
Rec rho	Recruitment Residuals	0	0	0
Future Catch	Amount of future landings (gutted lbs)	350,000	250,000	100,000
Ufuture	Future exploitation	NA	NA	NA
growth von B K	von Bertalanffy growth coefficient	0.06	0.04	0.08
growth Linfinity (cm)	von Bertalanffy asymptotic length	100.5	109.3	95.7
CV length age	Variation of length at age	0.08	0.08	0.08
length maturity (cm)	Length at maturity	55	55	55
wt (kg) at 100 cm	Size (weight) of fish at 100 cm	11	11	11
growth tzero	Size (length, cm) at time zero			
MSY min (gutted lbs)	Maximum Sustainable Yield Minimum	20,000	20,000	20,000
MSY max (gutted lbs)	Maximum Sustainable Yield Maximum	2,200,000	2,200,000	660,000
Umsy min	Minimum Exploitation at MSY	0.01	0.01	0.01
Umsy max	Maximum Exploitation at MSY	0.20	0.20	0.20
S min	Minimum Survivalship (S-0.2)	0.90	0.90	0.90
S max	Maximum Survivalship (S+0.2)	0.94	0.94	0.94

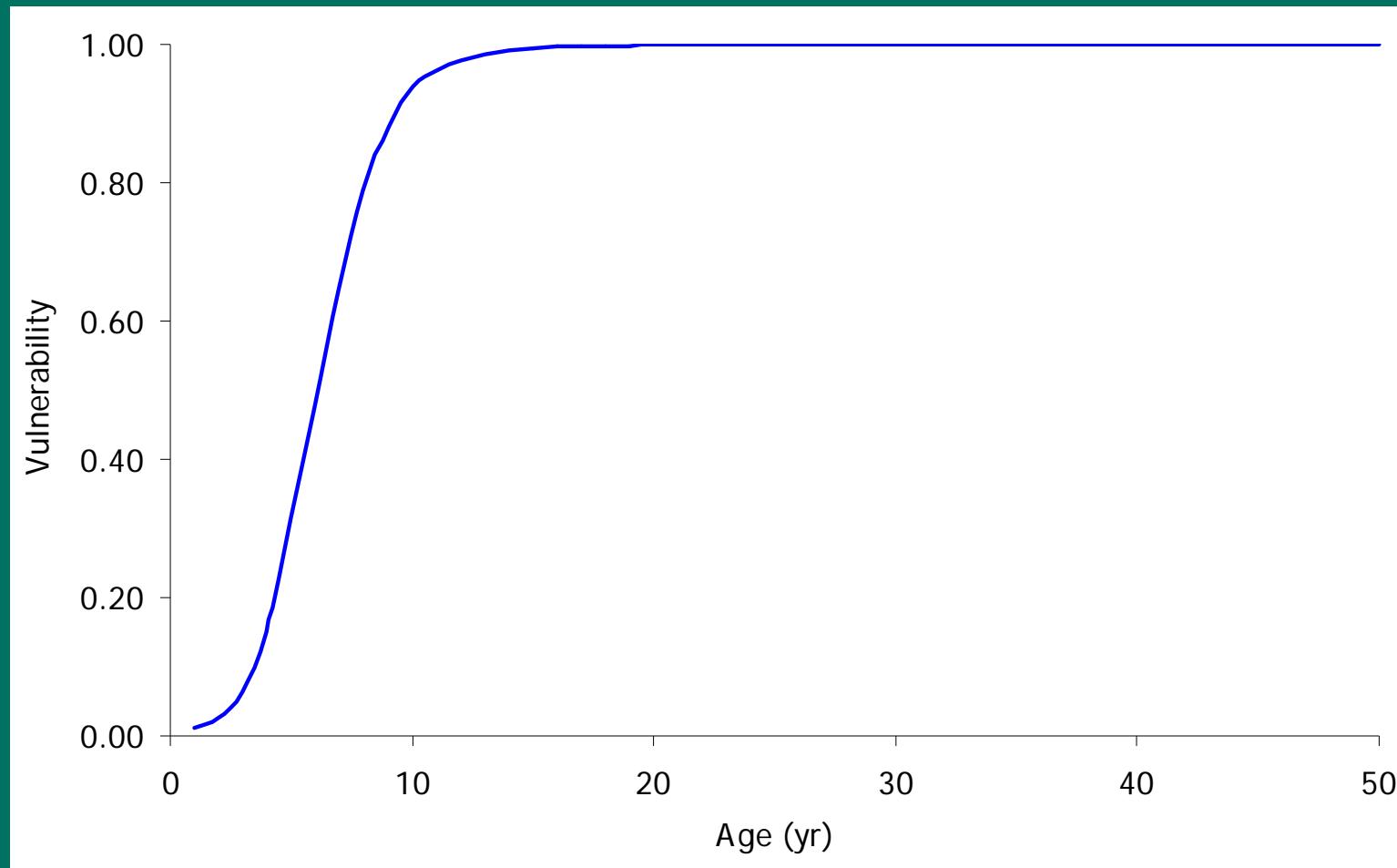
Catch Histories:



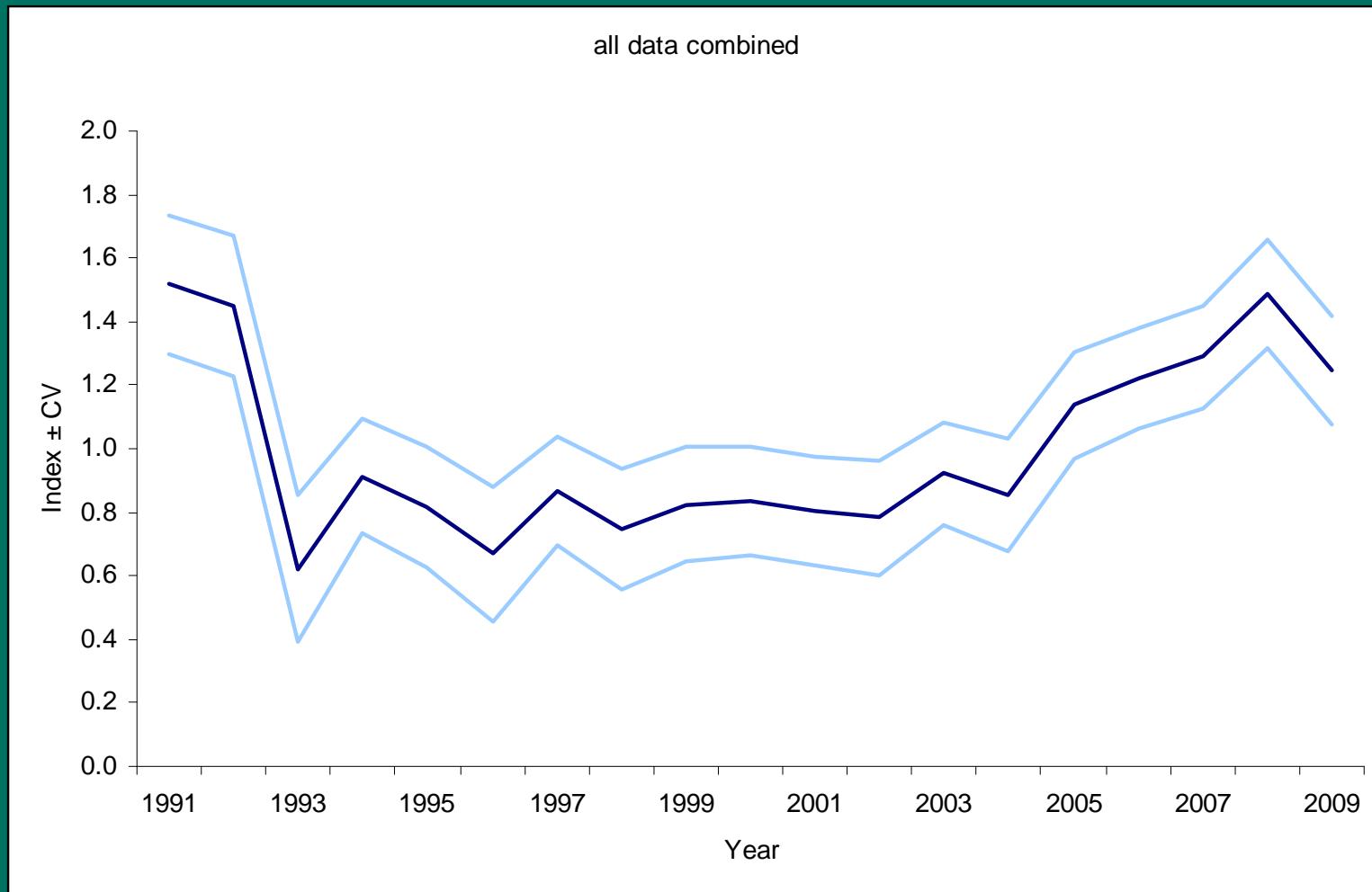
Age Vulnerabilities



Vulnerabilities calculated using logistic function for length selectivities via SS3
Same selectivities in all regions

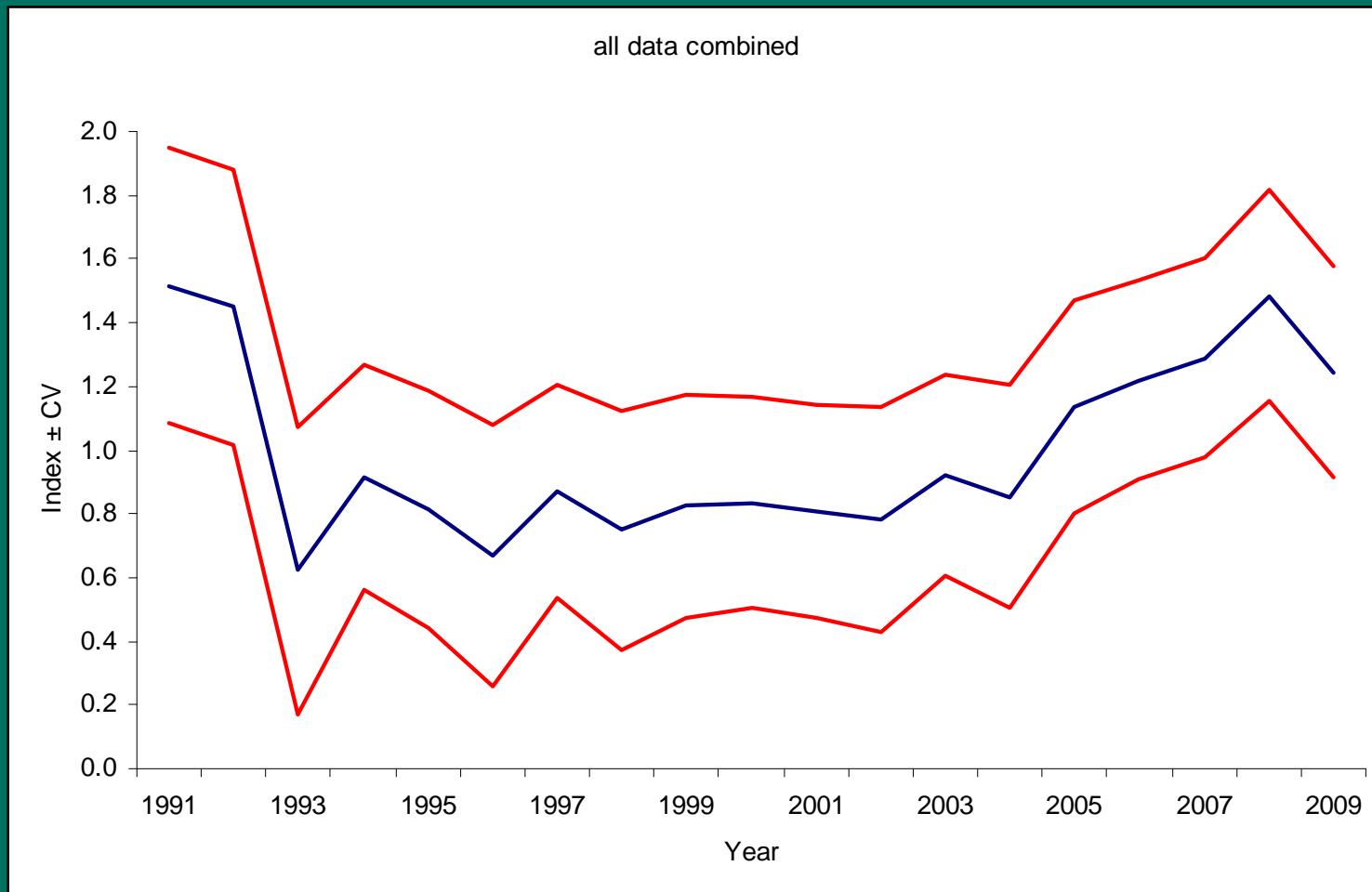


Index \pm CV: CM LL All data



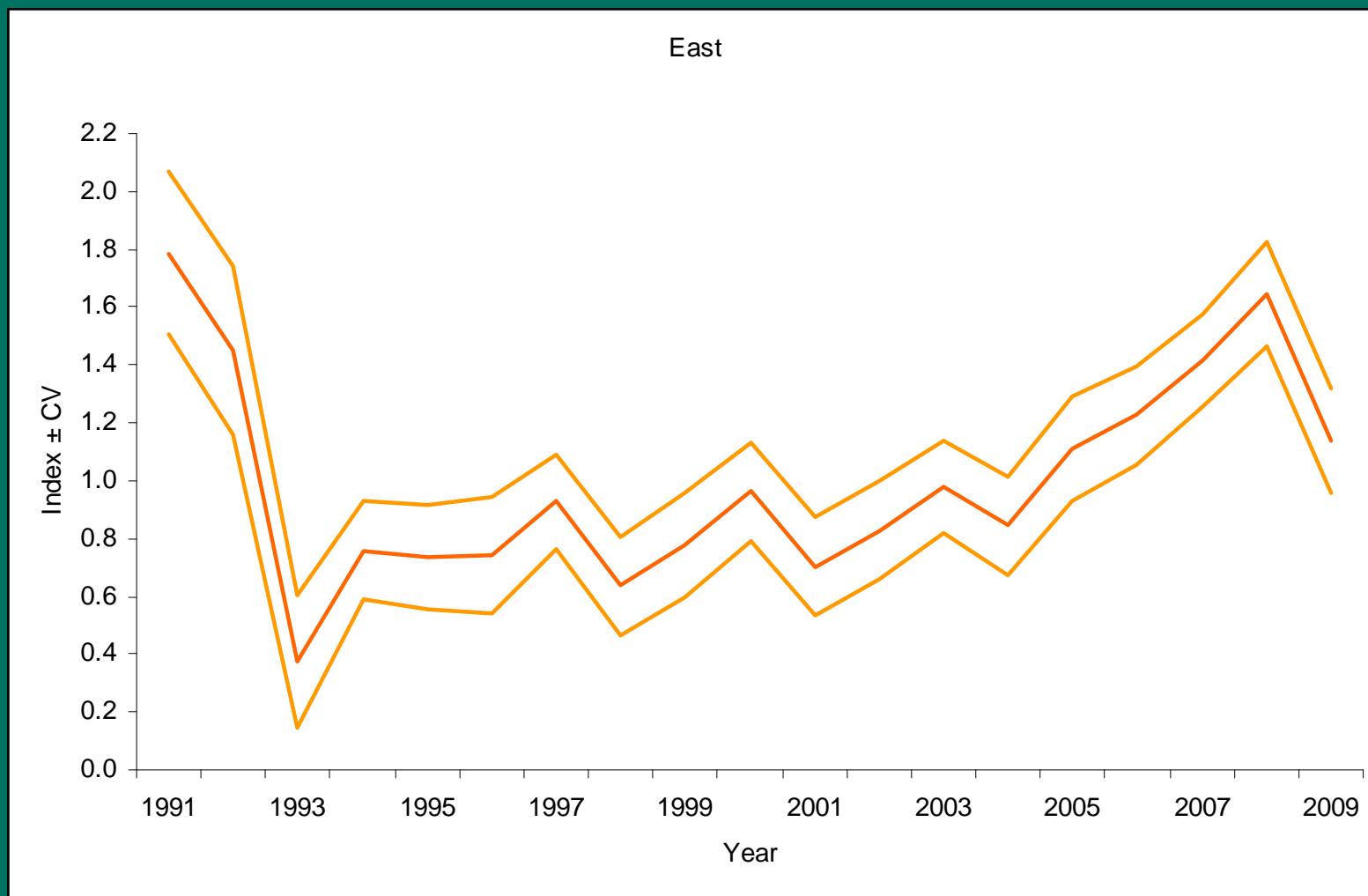
Same indices and CV as SS

Index \pm CV: CM LL All data



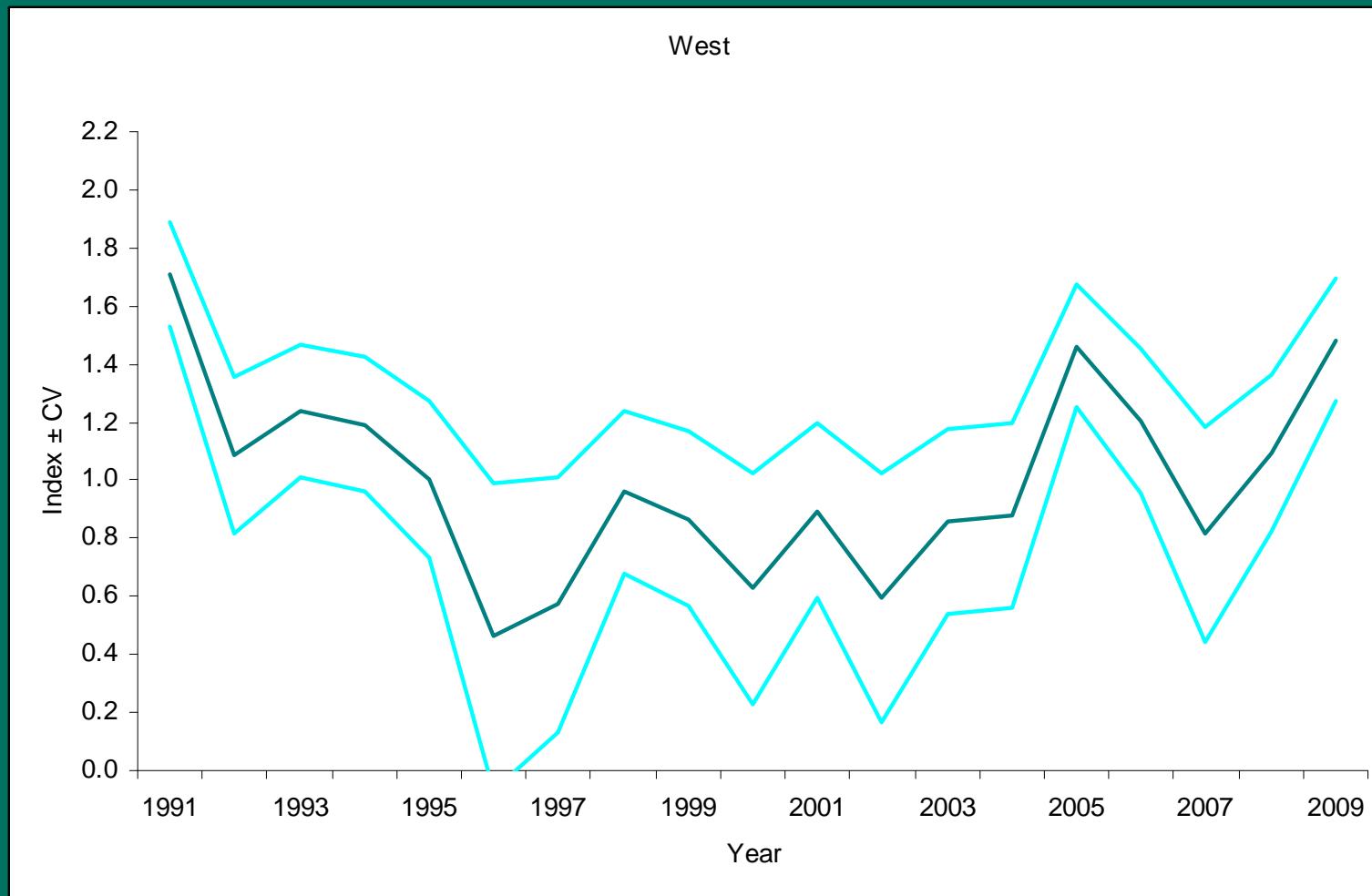
An increase in the uncertainty ($1.96 * \text{CV}$ for all years) .

Index \pm CV: CM LL East



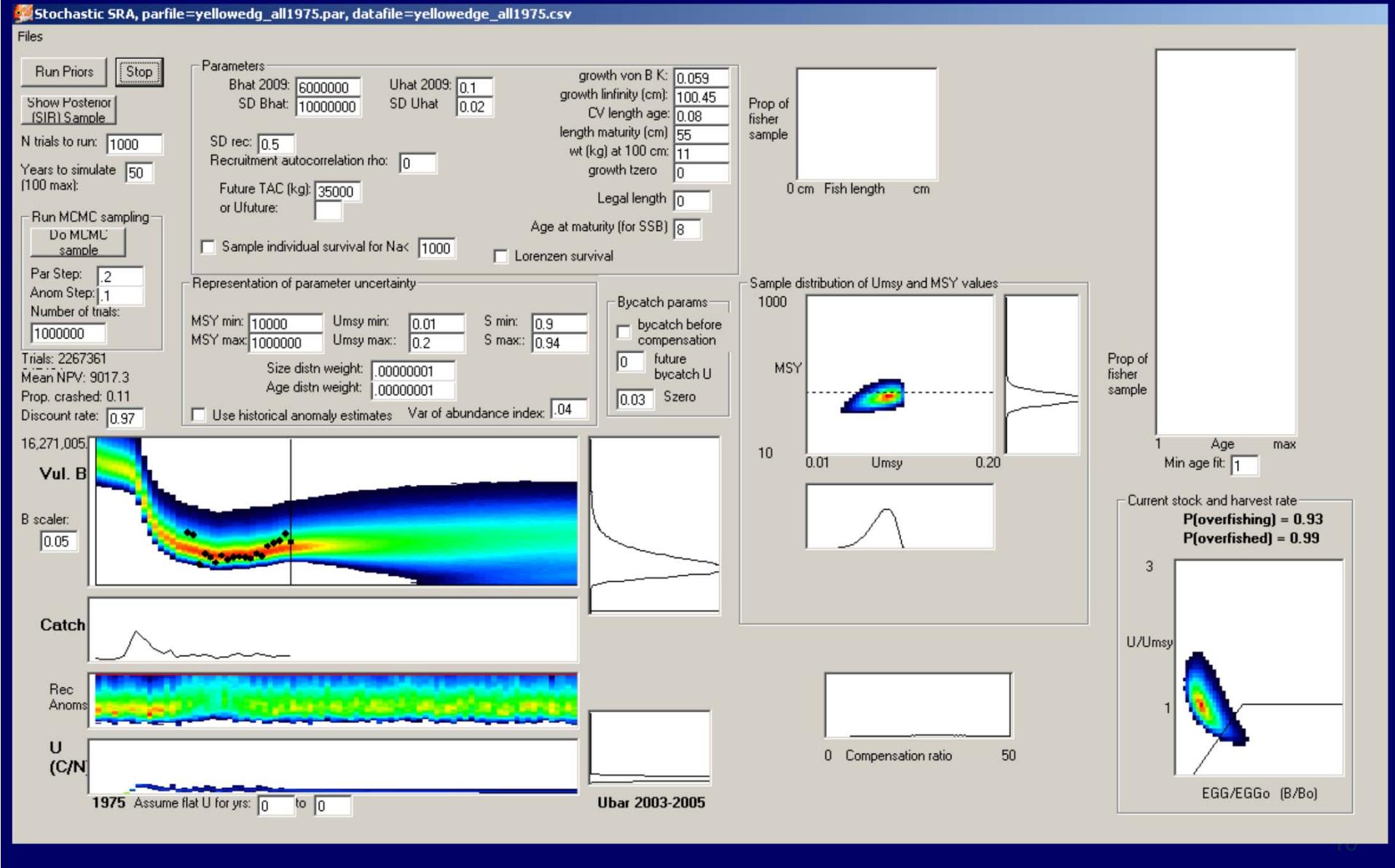
Same indices and CV as SS

Index \pm CV: CM LL West

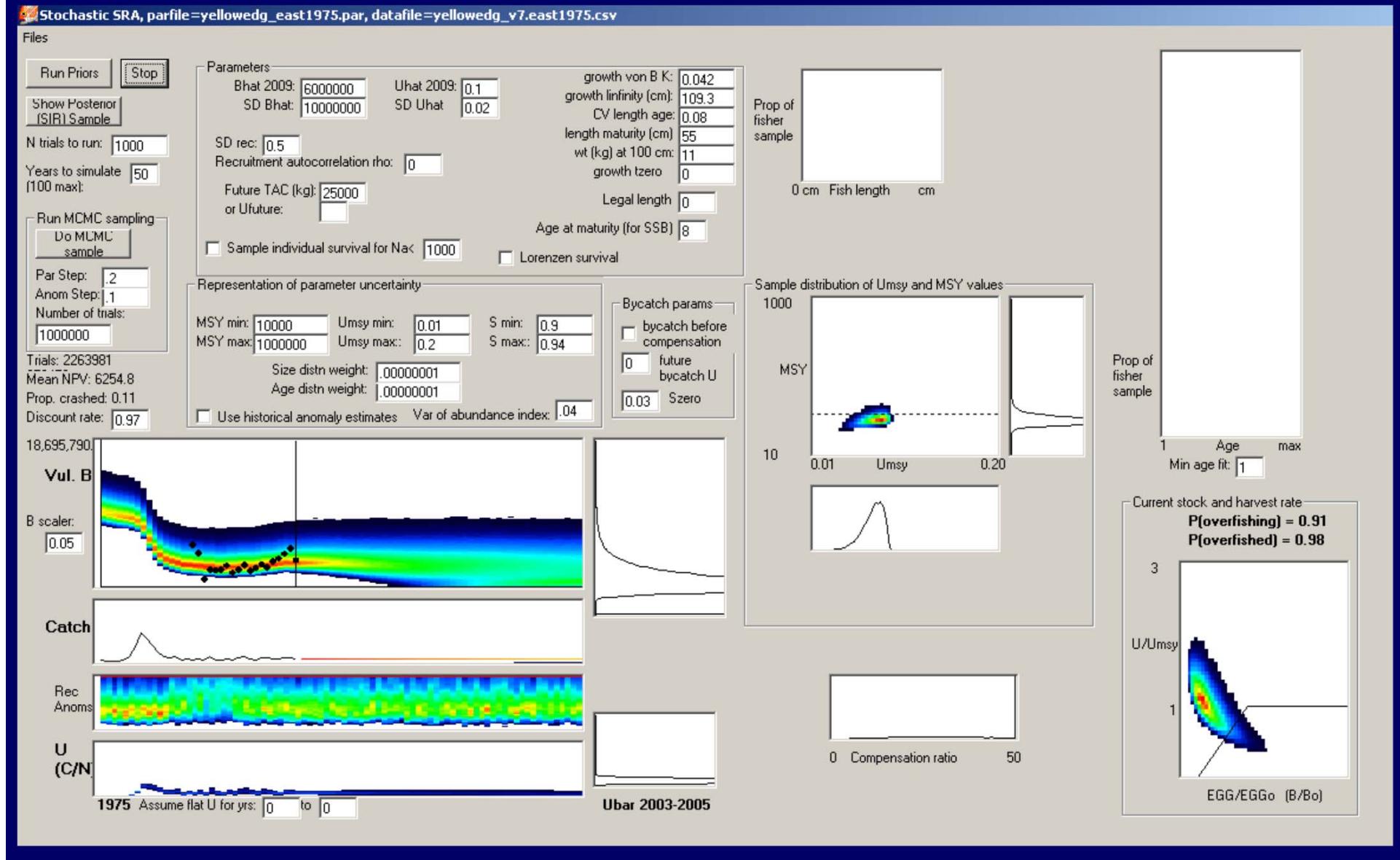


Same indices and CV as SS

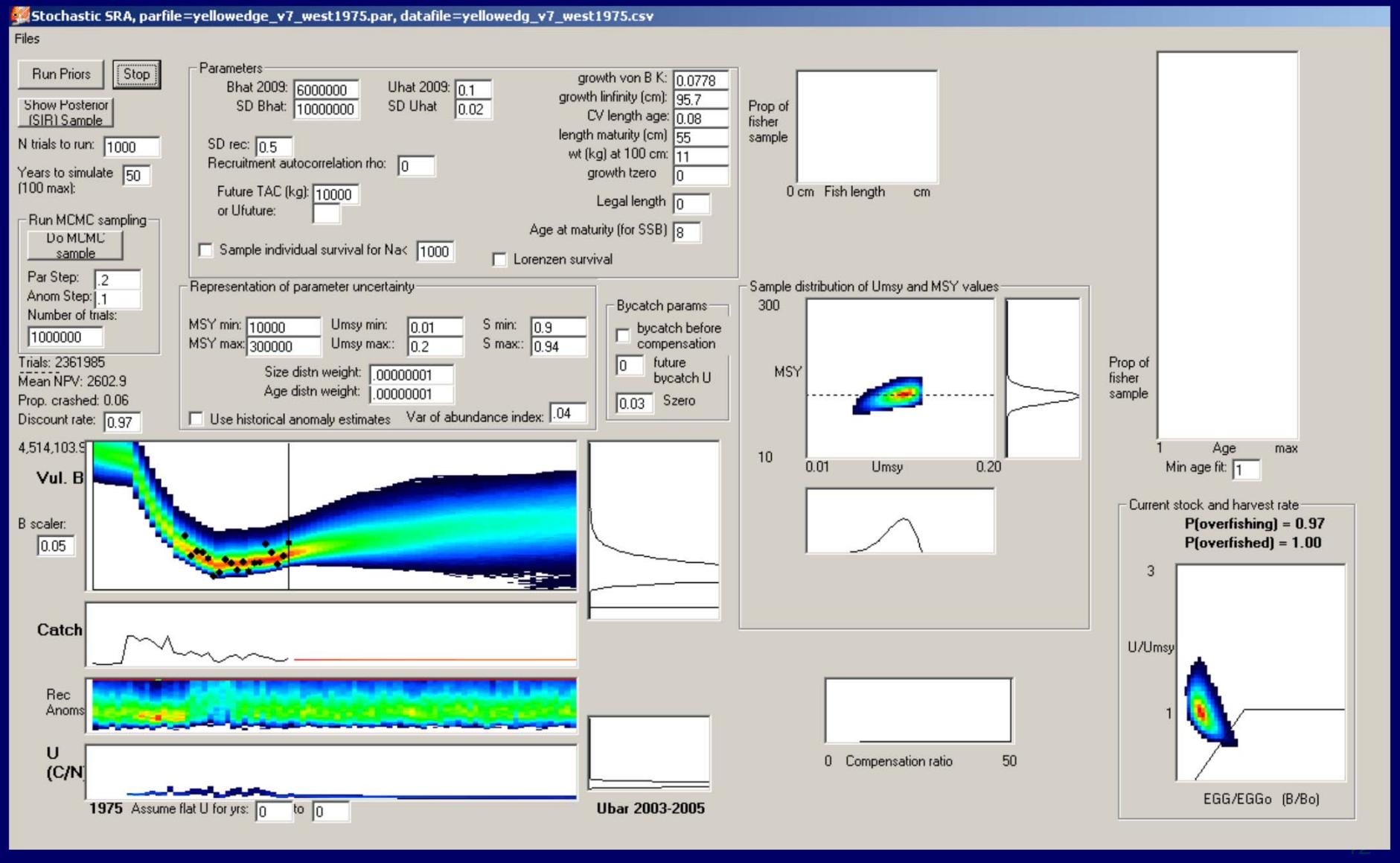
All data combined: SRA interface



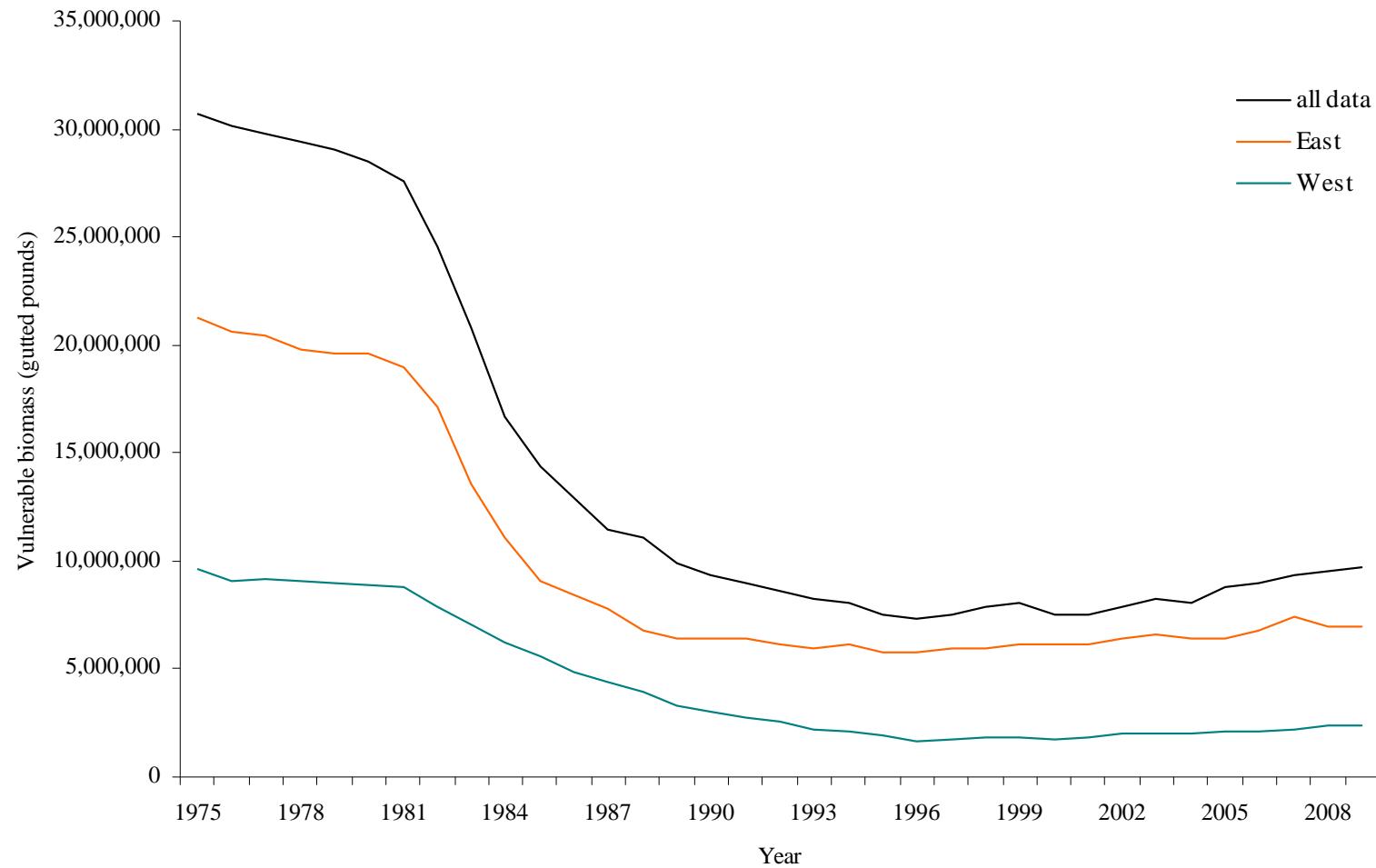
East Region: SRA interface



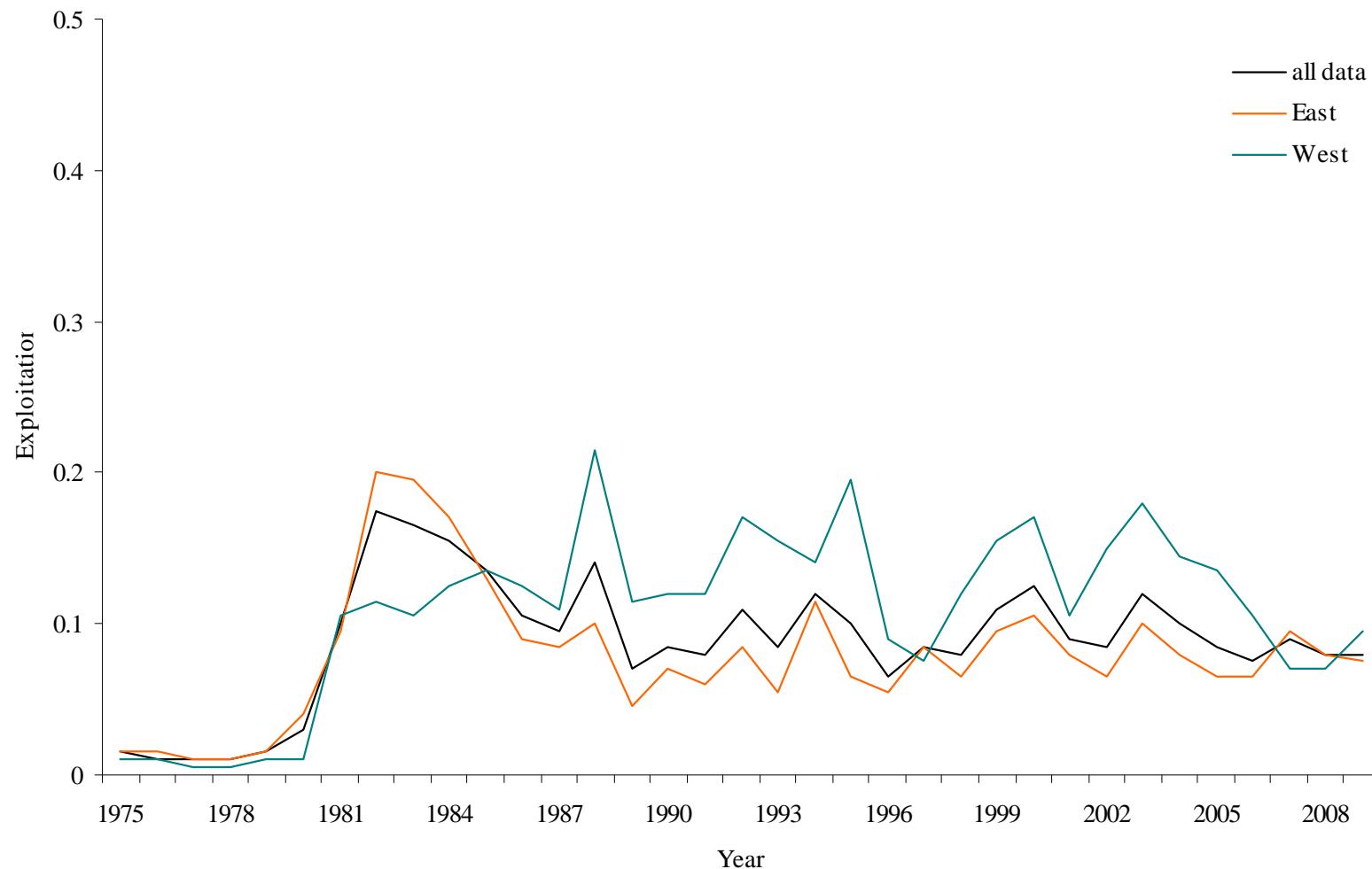
West Region: SRA interface



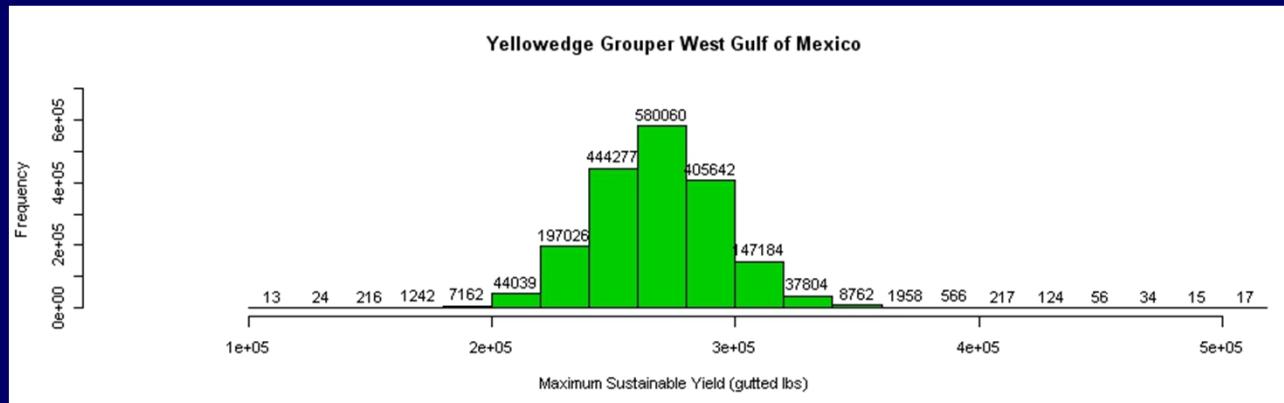
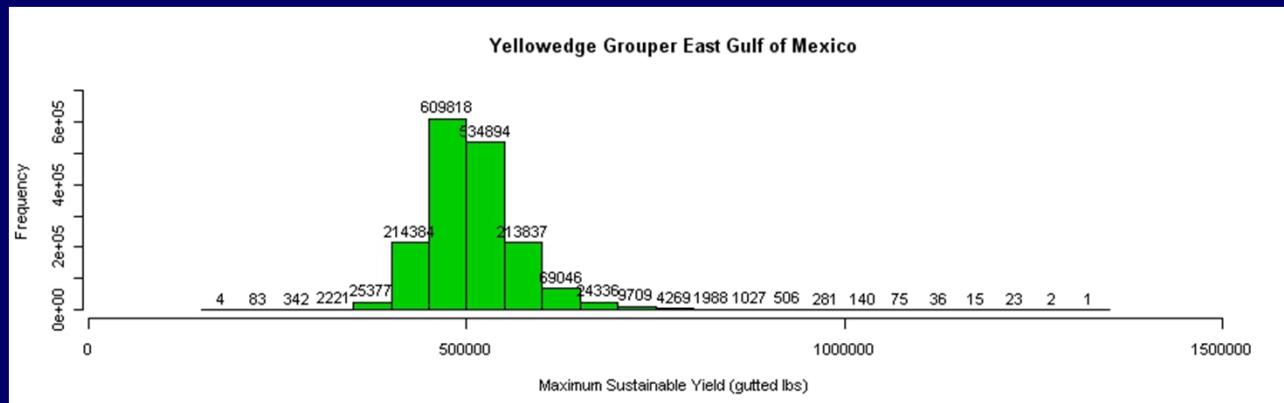
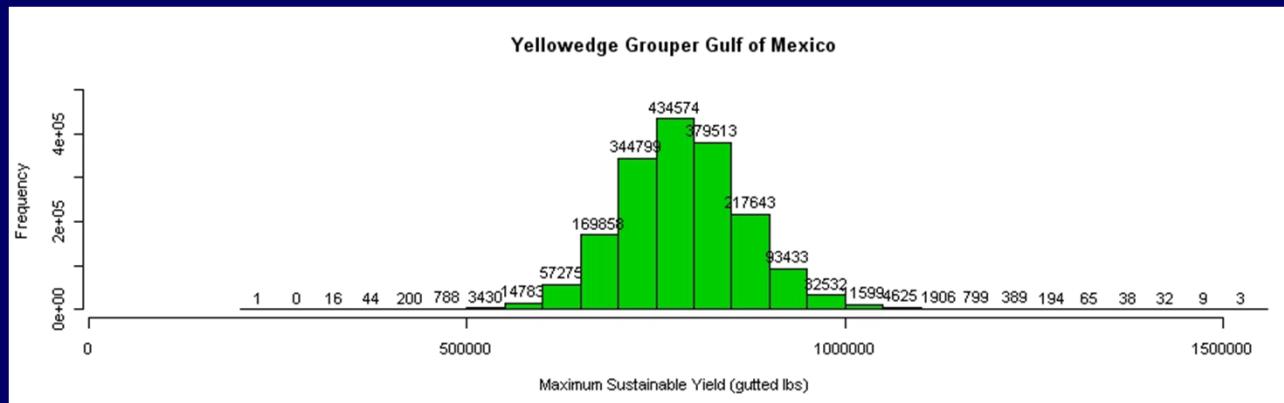
Model Results: Vulnerable Biomass



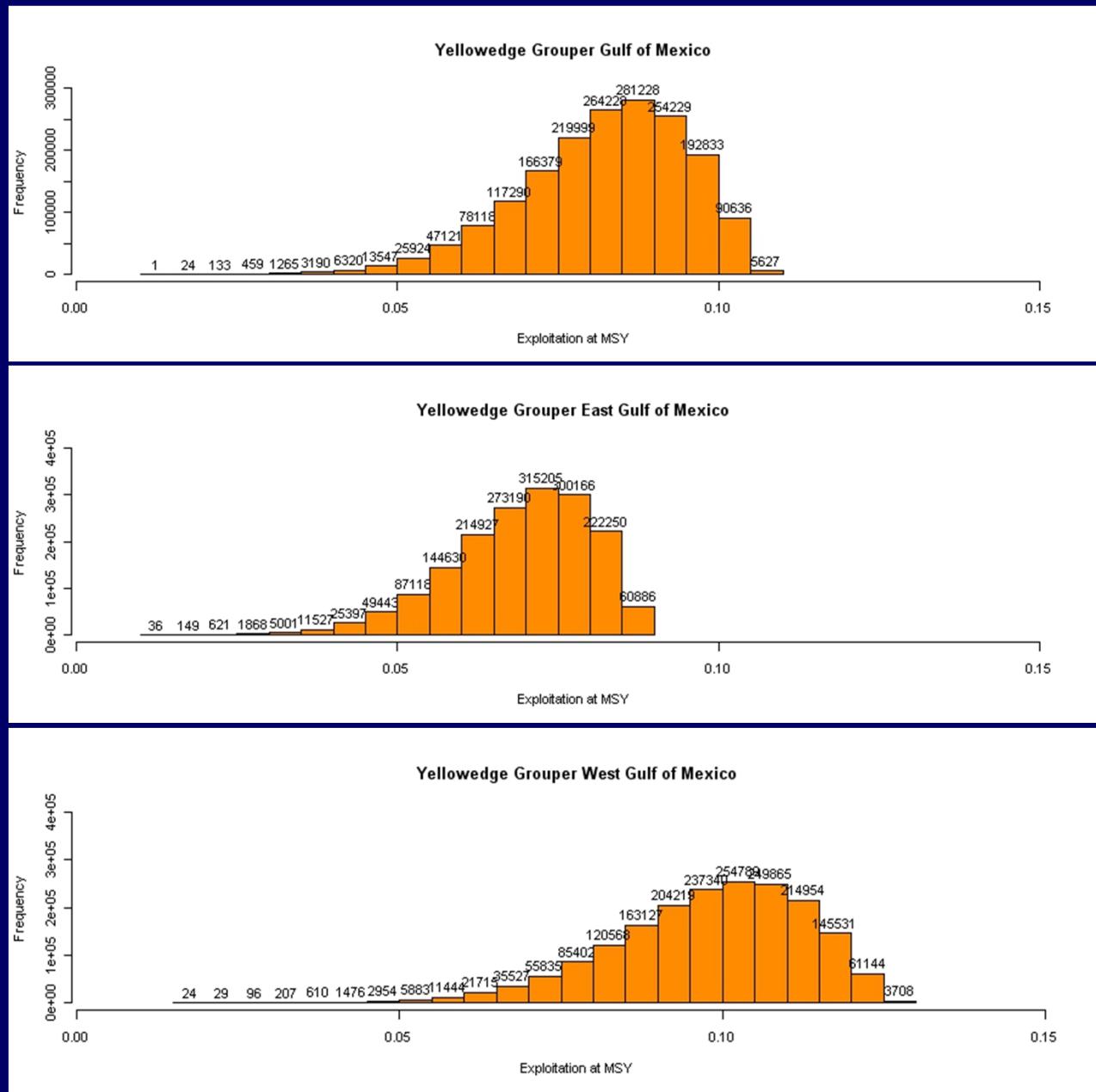
Model Results: Exploitation



Model Results: MSY



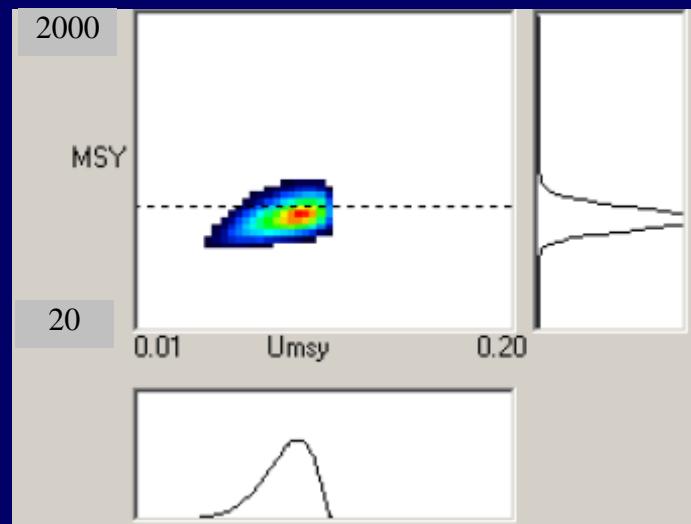
Model Results: Umsy



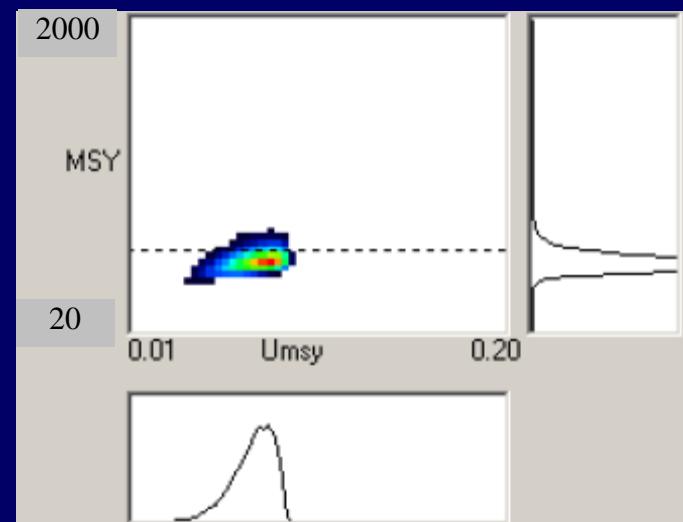
Model Results: Distribution MSY and Umsy



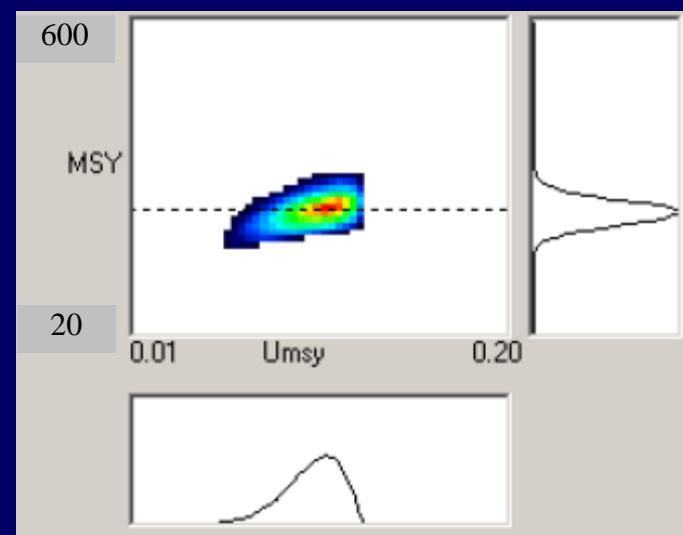
All data



East



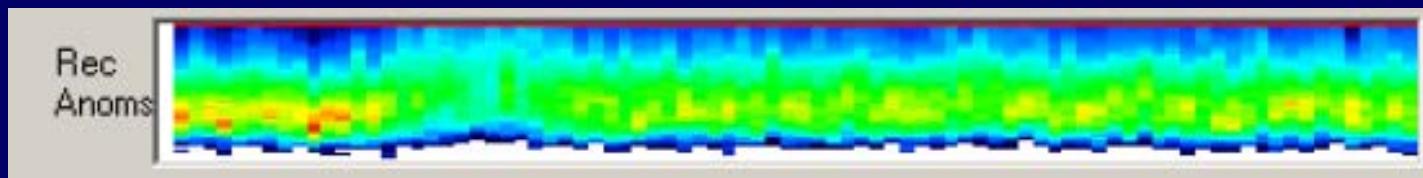
West



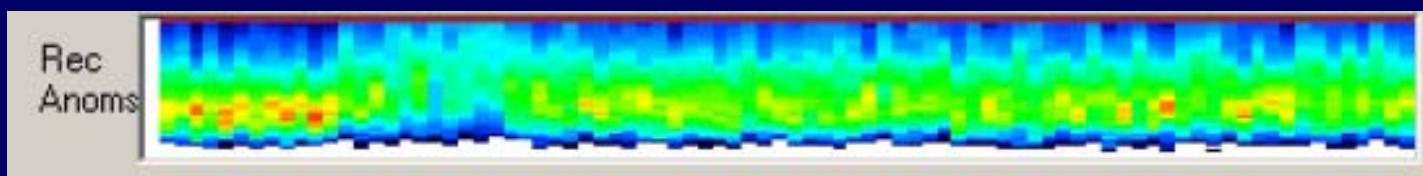
Model Results: Recruitment Anomalies



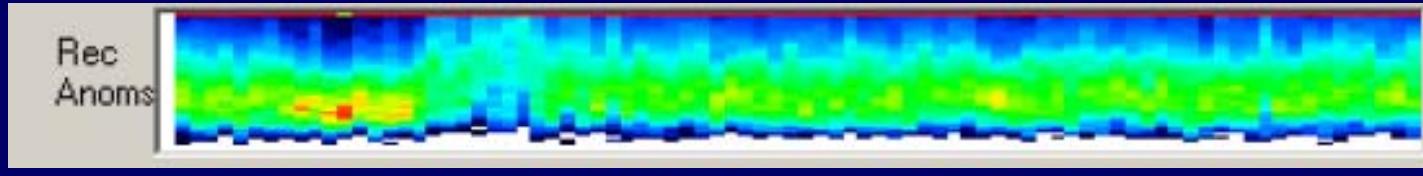
All data



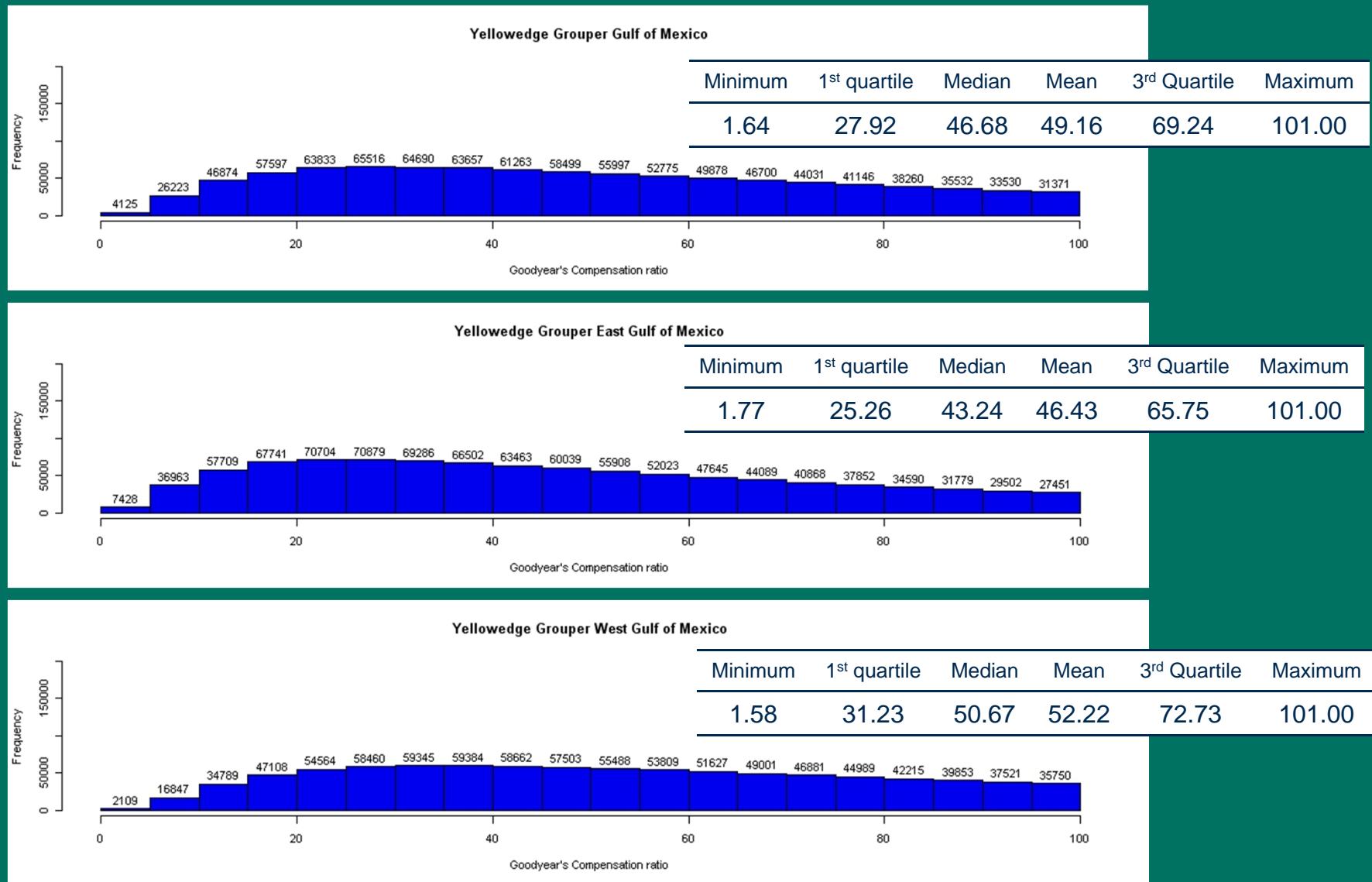
East



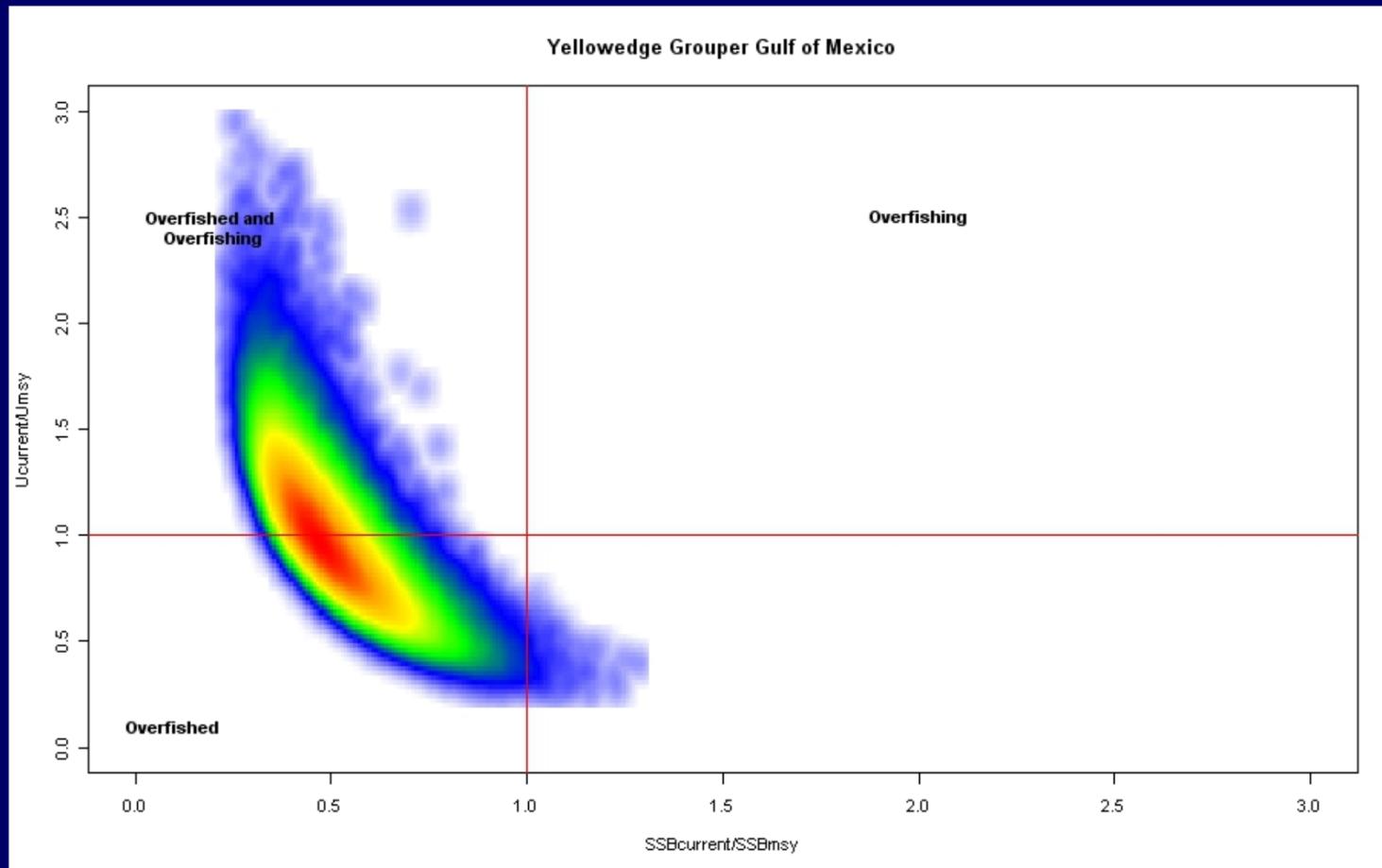
West



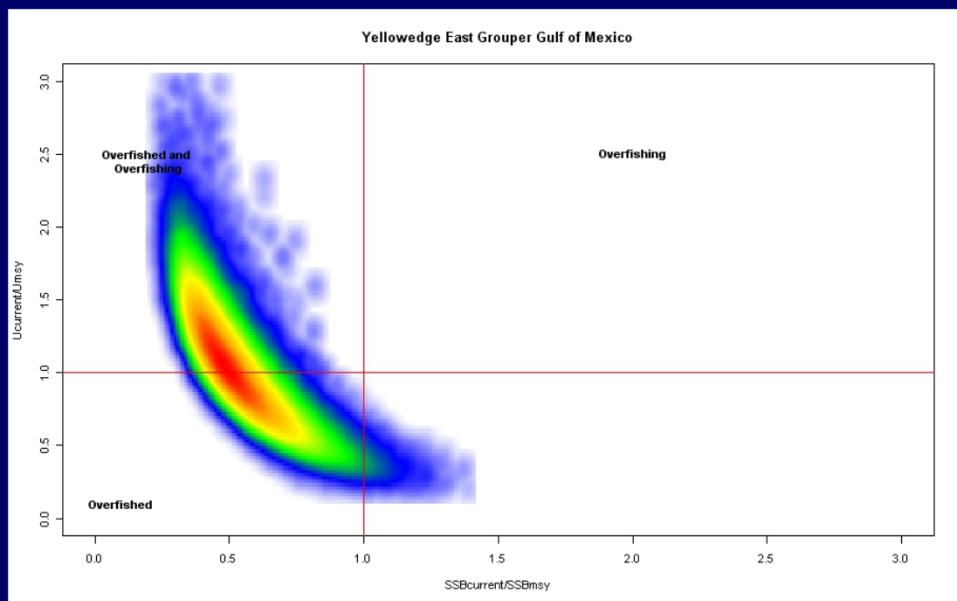
Model Results: Goodyear's Recruitment Compensation Ratio



Model Results: Gulf of Mexico Current Stock Status



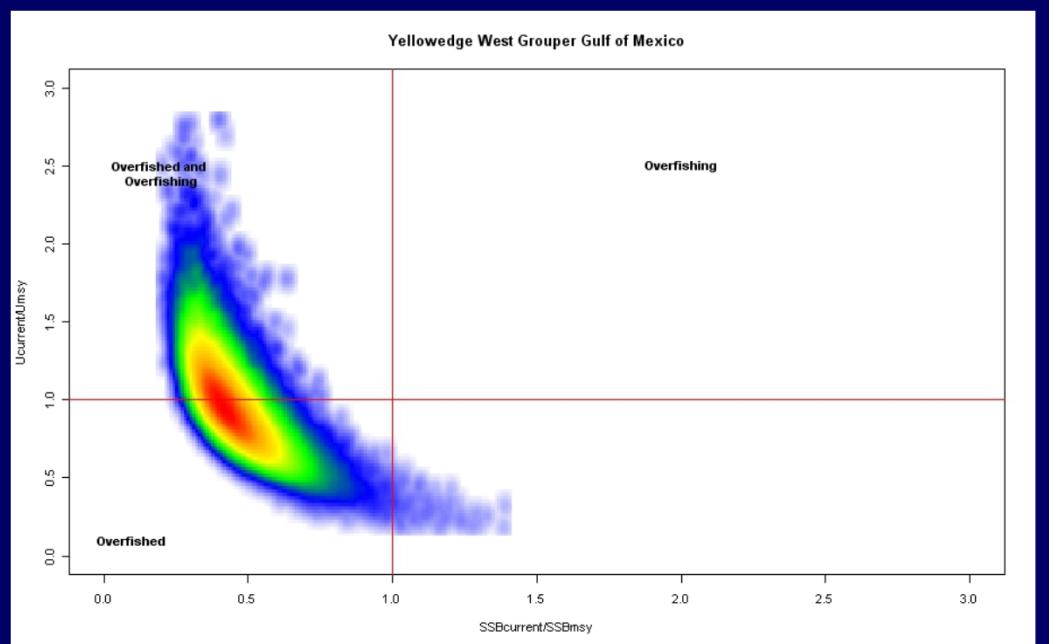
East



Model Results: Stock Status by Region



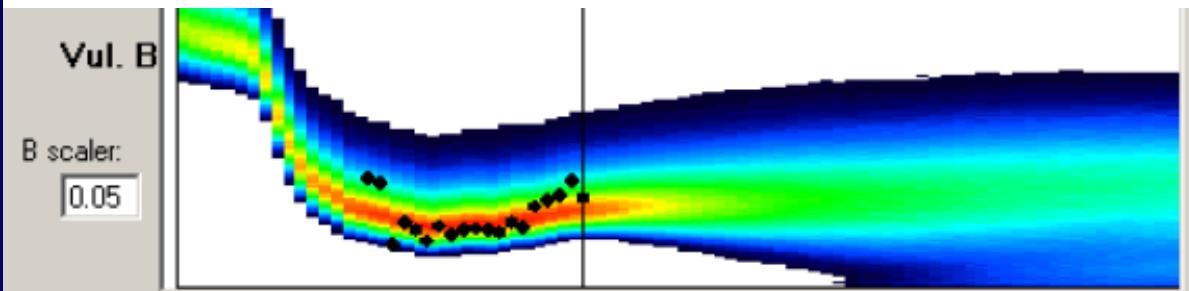
West



Model Results: Future Projections

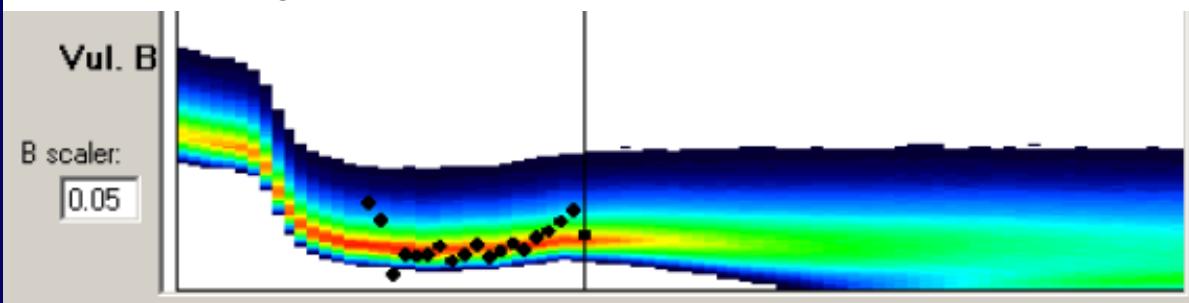


Future landings: entire Gulf of Mexico kept the same (770,000 gt lb)



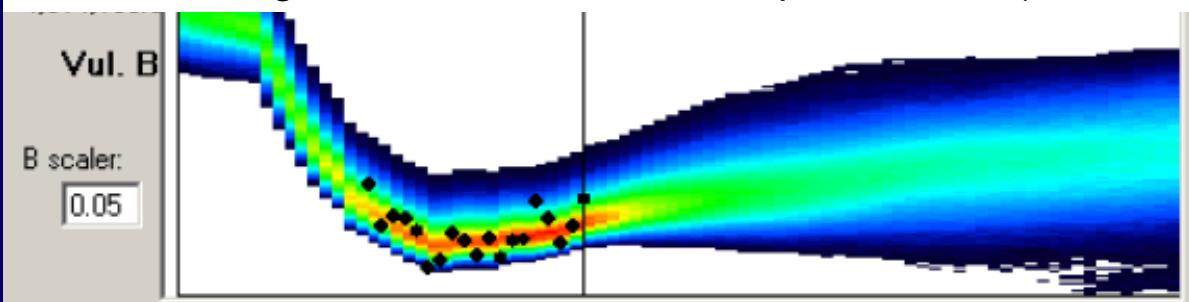
Probability
population
crash = 0.11

Future landings: East Gulf of Mexico kept the same (550, 000 gt lbs)



Probability
population
crash = 0.11

Future landings: West Gulf of Mexico kept the same (220,000 gt lbs)



Probability
population
crash = 0.06



Yellowedge Grouper Summary Gulf of Mexico



Model	Minimum	1st quartile	Median	Mean	3rd Quartile	Maximum
MSY*	242,504	731,041	783,730	786,155	837,743	1,550,044
Umsy	0.01	0.08	0.08	0.08	0.09	0.11
Ucurrent	0.02	0.07	0.08	0.08	0.09	0.17
U2009/Umsy	0.24	0.83	0.98	0.99	1.14	3.49
reckK (values >0)	1.64	44.04	91.10	1662	218.70	7.86 e+8
reckK (values 0-101)	1.64	27.92	46.68	49.16	69.24	101.00
Biomass 2009*	5,584,215	9,872,134	11,329,365	11,933,422	13,280,423	51,477,072
SSB 2009*	4,466,490	8,719,136	10,136,684	10,723,104	12,034,832	48,059,965
SSB msy*	14,177,690	19,398,148	20,989,859	21,452,822	22,971,781	58,289,242
SSB2009/SSBmsy	0.23	0.43	0.49	0.50	0.56	1.29

*gutted pounds

Overfished = 99.56%, Overfishing = 45.79%



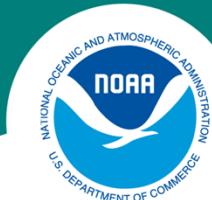
Yellowedge Grouper Summary East Gulf of Mexico



Model	Minimum	1 st quartile	Median	Mean	3 rd Quartile	Maximum
MSY*	192,240	468,034	500,220	507,055	536,817	1,304,012
Umsy	0.01	0.06	0.07	0.07	0.08	0.09
Ucurrent	0.01	0.06	0.07	0.07	0.09	0.17
U2009/Umsy	0.17	0.85	1.04	1.05	1.23	3.61
recK (values > 0)	1.773	38.54	81.02	1041	204.2	3.48 e+8
recK (values 0 – 101)	1.77	25.26	43.24	46.43	65.75	101.00
Biomass 2009*	3,774,250	7,250,882	8,542,769	9,283,510	10,438,713	48,302,469
SSB 2009*	3,295,855	6,638,007	7,907,848	8,630,952	9,761,905	46,406,526
SSB msy*	10,970,018	14,594,356	15,868,607	16,410,935	17,579,365	5,469,577
SSB2009/SSBmsy	0.22	0.43	0.50	0.52	0.58	1.39

*gutted pounds

Overfished = 99.75%, Overfishing = 55.08%



Yellowedge Grouper Summary West Gulf of Mexico



Model	Minimum	1 st quartile	Median	Mean	3 rd Quartile	Maximum
MSY*	115,146	251,102	268,519	268,519	285,053	559,303
Umsy	0.02	0.09	0.10	0.10	0.11	0.13
Ucurrent	0.01	0.08	0.09	0.09	0.11	0.18
U2009/Umsy	0.18	0.83	0.96	0.98	1.10	3.14
recK (values > 0)	1.58	51.82	104.8	947	242.2	8.55 e+7
recK (values 0 – 101)	1.58	31.23	50.67	52.22	72.73	101.00
Biomass 2009*	1,614,859	2,782,187	3,115,079	3,231,922	3,538,360	26,785,714
SSB 2009*	1,200,176	2,279,541	2,592,593	2,705,026	2,991,623	24,096,120
SSB msy*	4,259,259	5,641,534	6,058,201	6,168,430	6,571,869	22,751,323
SSB2009/SSBmsy	0.20	0.38	0.43	0.44	0.49	1.39

*gutted pounds

Overfished = 99.99%, Overfishing = 41.98%