Science, Service, Stewardship

Golden Tilefish stochastic SRA

SEDAR 22

Review Workshop

February 14-17, 2011

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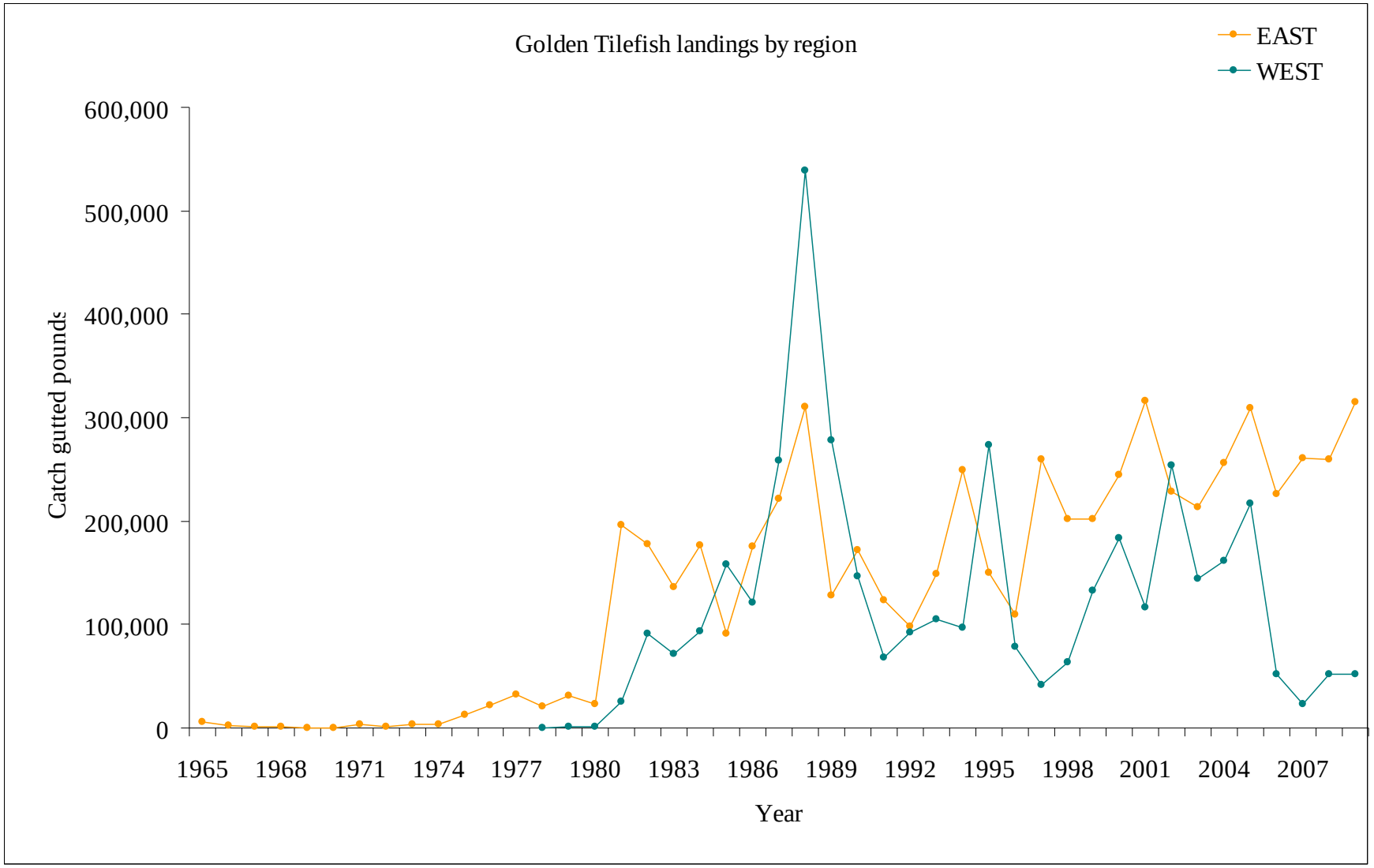
Review Models & Inputs:

- 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:

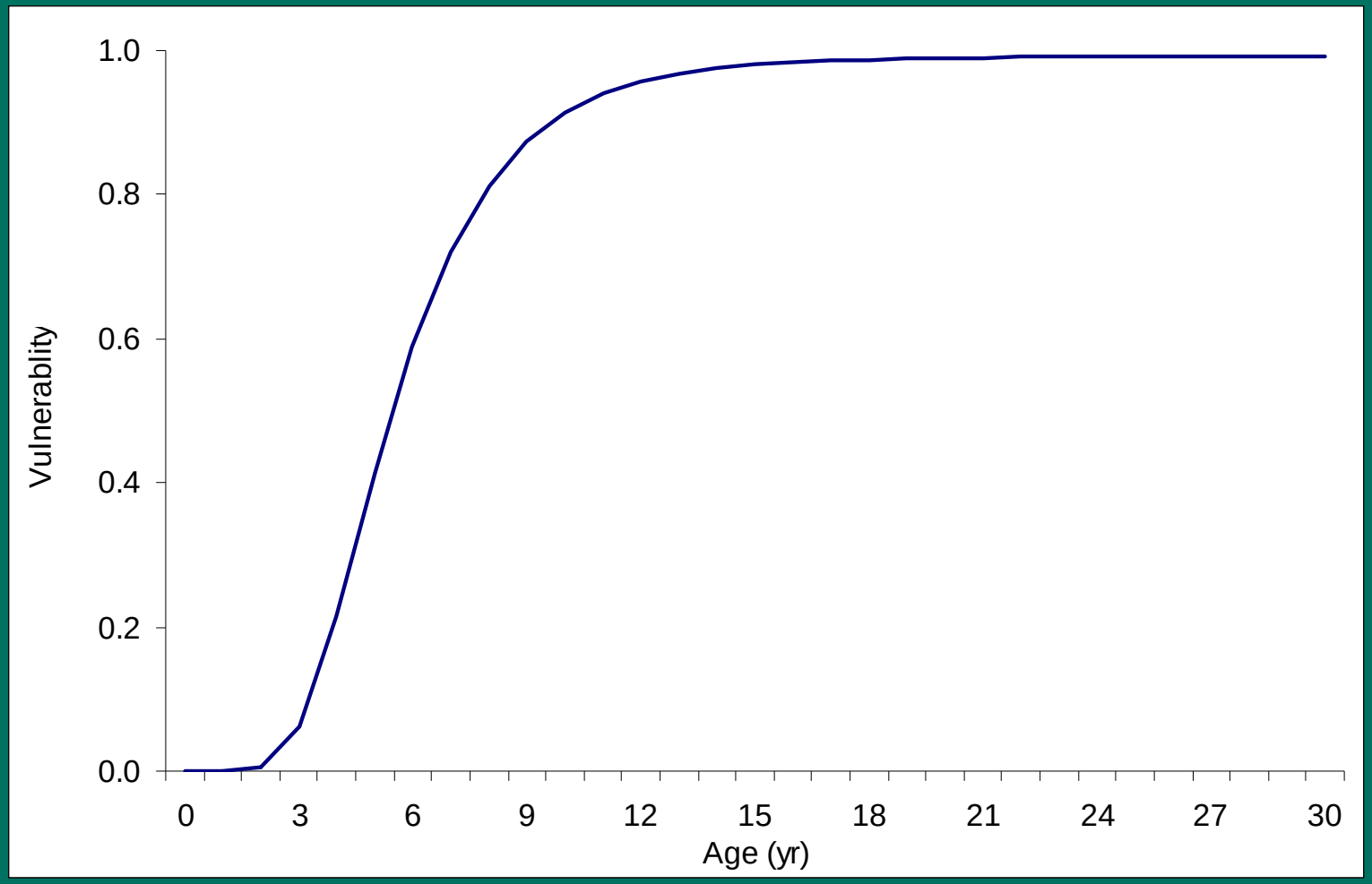
Parameter	Definition	All	East	West
# ages	Number of age classes	30	30	30
Bhat 2009	Biomass in the last year	6.0E+06	6.0E+06	6.0E+06
SD Bhat	Standard Deviation Bhat	1.0E+08	1.0E+08	1.0E+08
Uhat 2009	Exploitation for the last year	0.10	0.10	0.10
SD Uhat	Standard Deviation of Uhat	0.02	0.02	0.02
SD rec	Standard Deviation of RecK	0.50	0.50	0.50
Rec rho	Recruitment Residuals	0	0	0
Future Catch*	Amount of future landings (catch)			
Ufuture	Future exploitation	0.2	0.2	0.2
growth von B K	von Bertalanffy growth coefficient	0.14	0.11	0.17
growth Linfinity (cm)	von Bertalanffy asymptotic length	83	88	77
CV length age	Variation of length at age	0.08	0.08	0.08
length maturity (cm)	Length at maturity	34	34	34
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	1,100,000	880,000	440,000
Umsy min	Minimum Exploitation at MSY	0.05	0.05	0.05
Umsy max	Maximum Exploitation at MSY	0.50	0.40	0.50
S min	Minimum Survivalship (S-0.2)	0.84	0.84	0.84
S max	Maximum Survivalship (S+0.2)	0.88	0.88	0.88

Catch History: Commercial



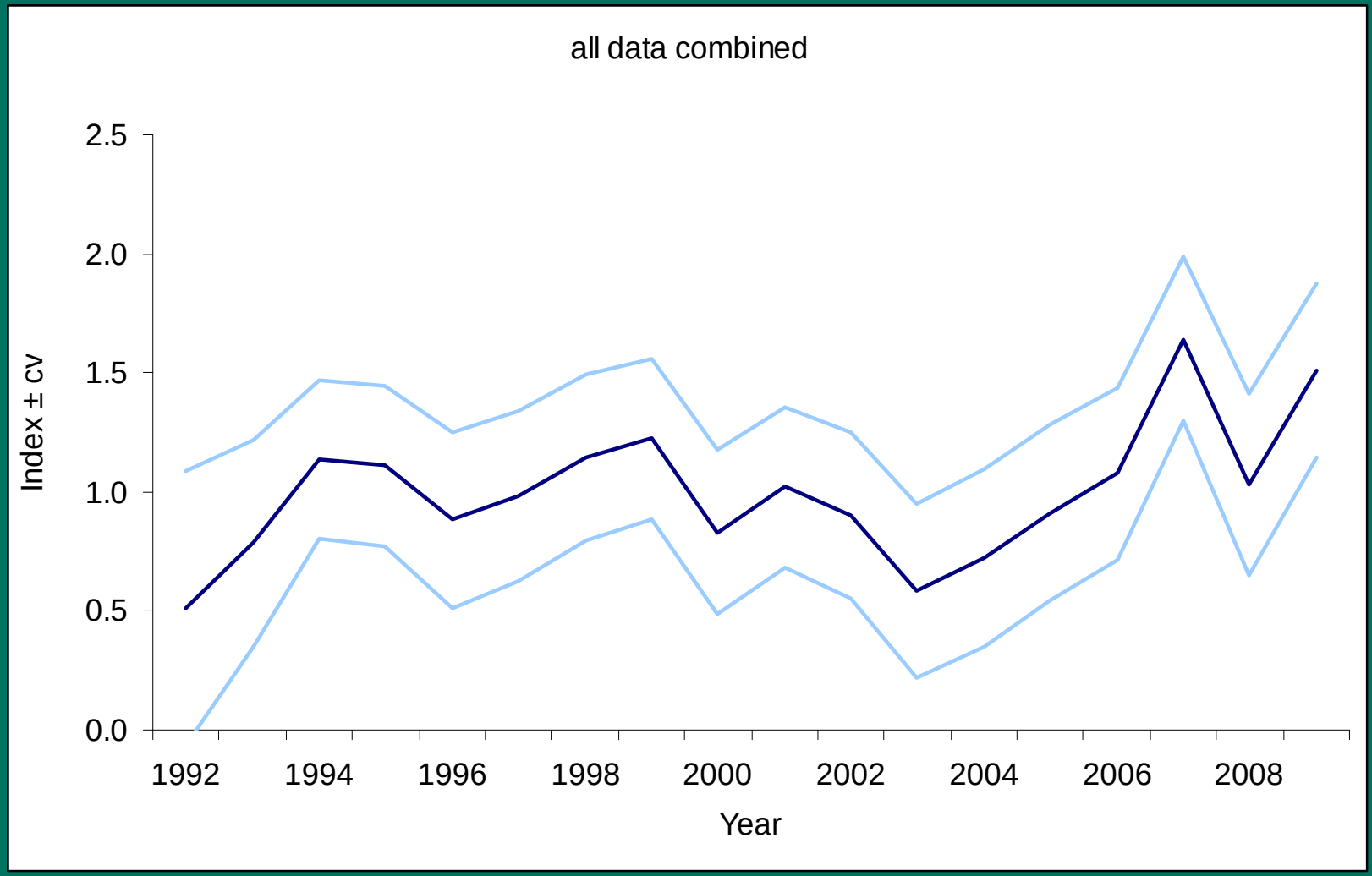
Age Vulnerabilities

Vulnerabilities calculated using logistic function for length selectivities from SS3 (ASel2)



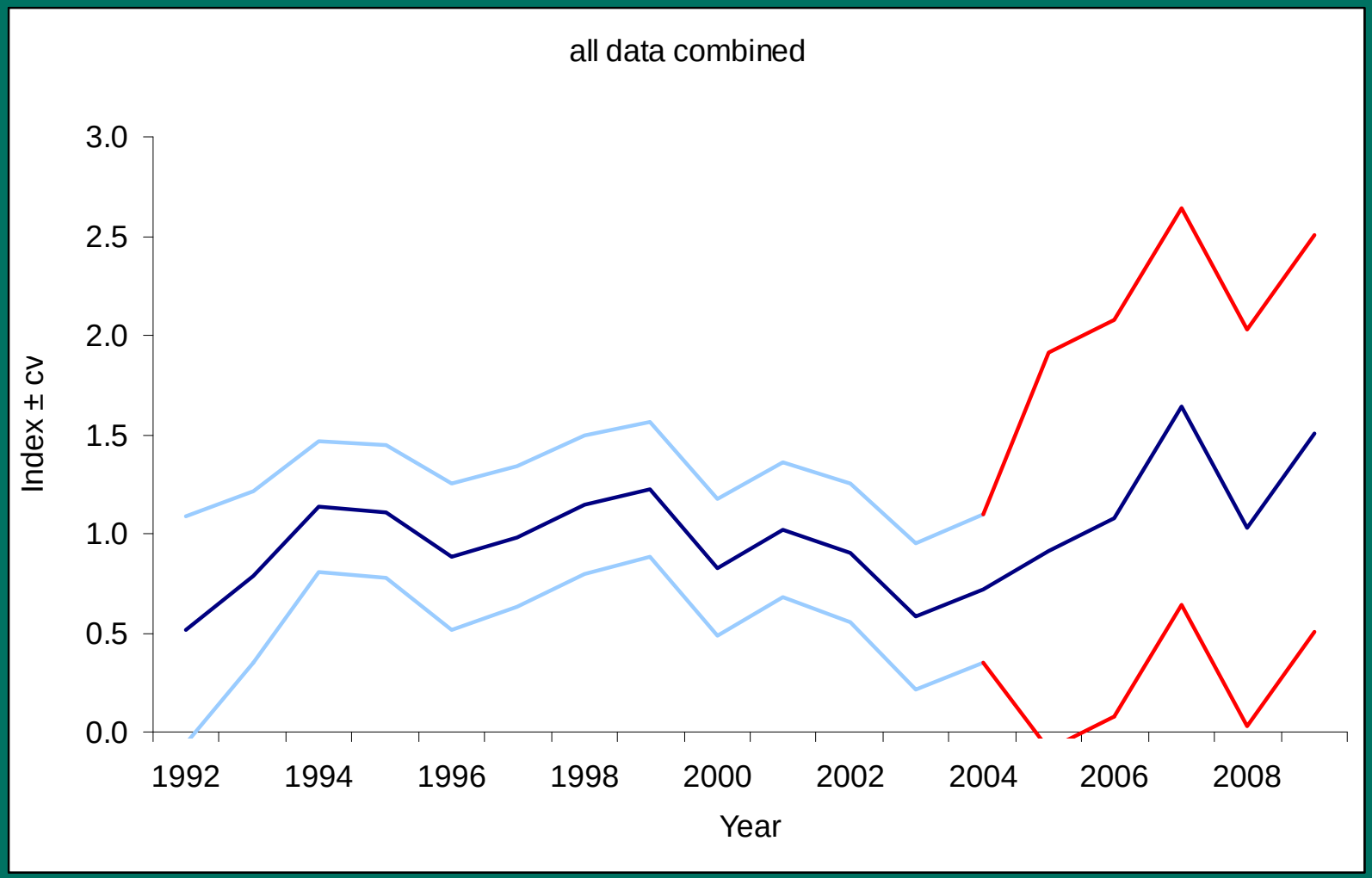
Same selectivities in both region

Index ± CV : CM LL all data



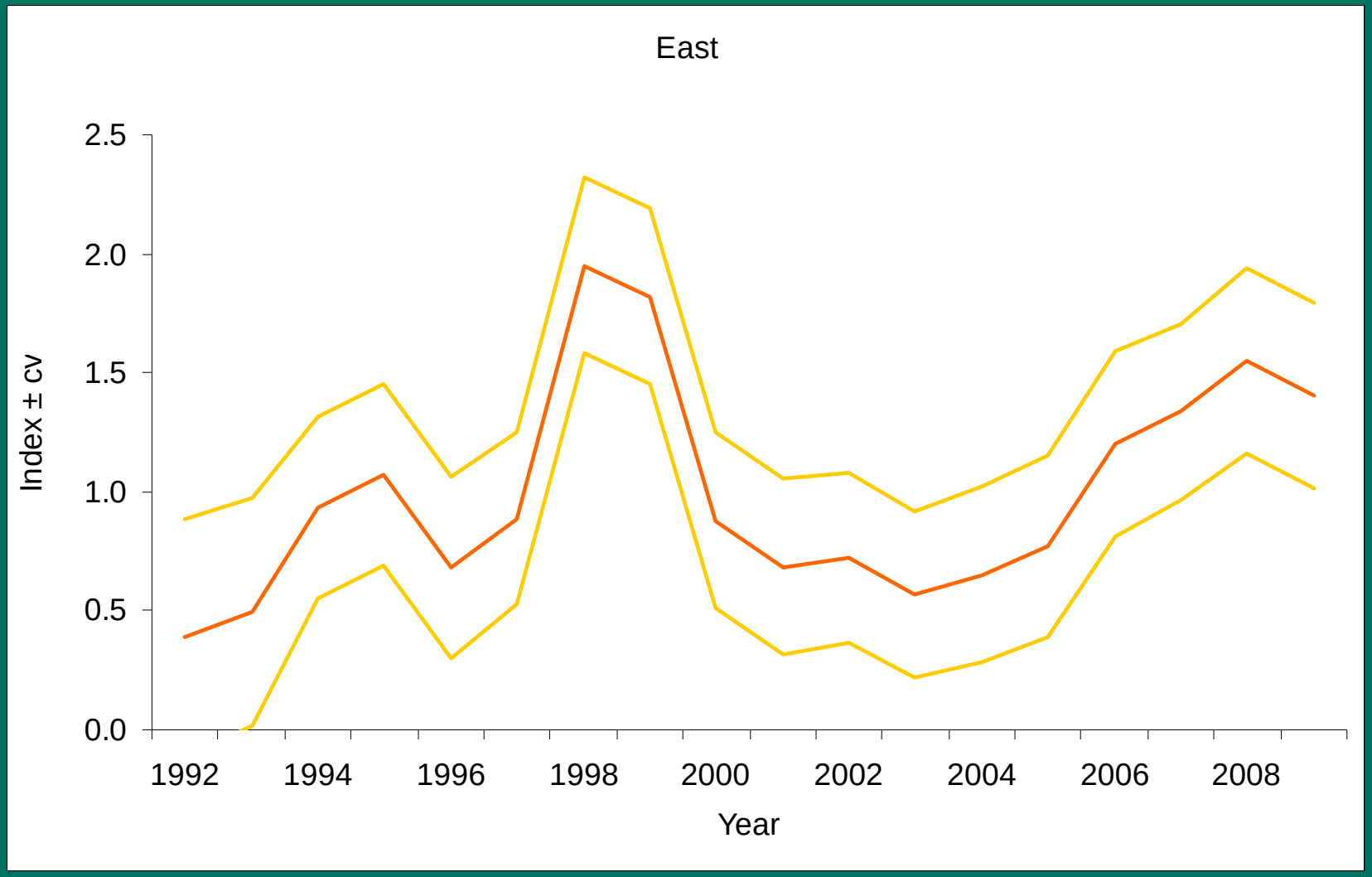
Same indices and CV as SS

Index ± CV: CM LL all data



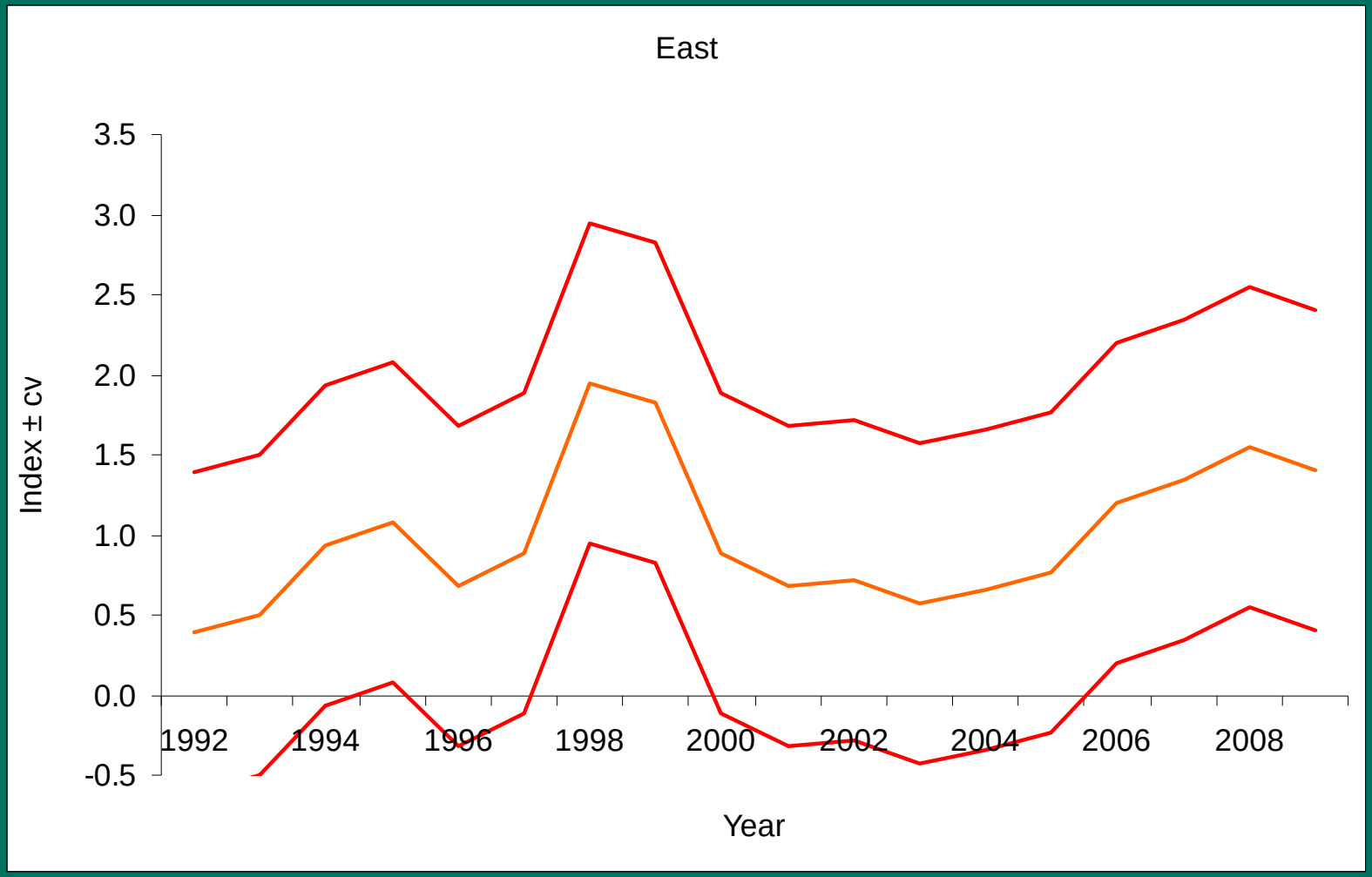
Uncertainty in last 5 years of index increased to 1.

Index ± CV : CM LL East region



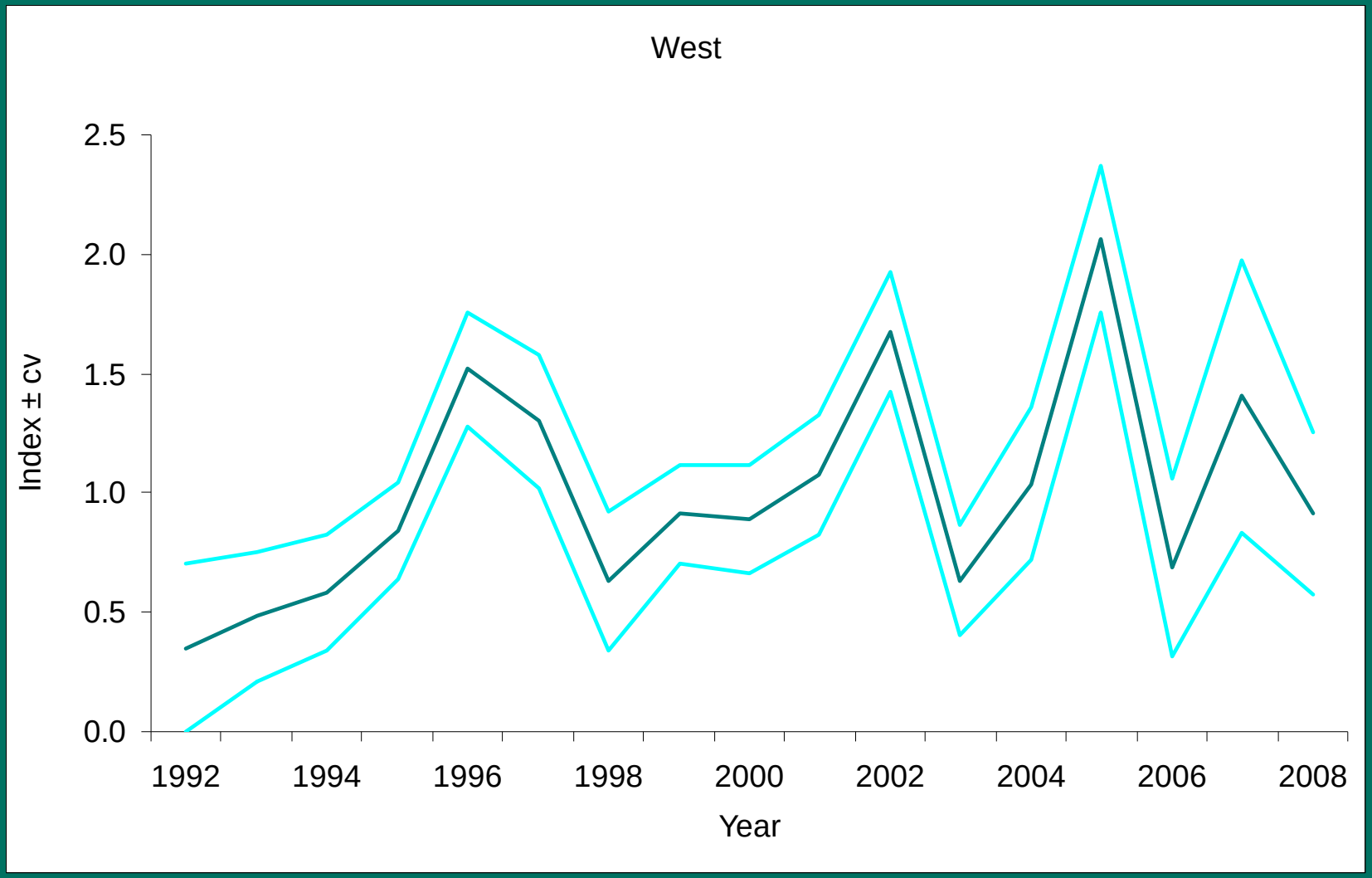
Same indices and CV as SS

Index ± CV : CM LL East region



Uncertainty in all years of index increased to 1.

Index ± CV : CM LL West region



Same indices and CV as SS

All data combined: SRA Interface

Stochastic SRA, parfile=tilefish_23.1_all uncern.par, datafile=Tilefish_23.1_all uncern.csv

Files

Run Priors | Stop

Show Posterior (SIR) Sample

N trials to run: 1000

Years to simulate (100 max): 50

Run MCMC sampling

Do MCMC sample

Par Step: .2

Anom Step: .1

Number of trials: 1000000

Trials: 2289601

Mean NPV: 6590.8

Prop. crashed: 0.00

Discount rate: 0.97

Parameters

Bhat 2009: 6000000 SD Bhat: 10000000

Uhat 2009: 0.1 SD Uhat 0.02

SD rec: 0.5

Recruitment autocorrelation rho: 0

Future TAC (kg): 1000

or Ufuture: 0.2

growth von B K: 0.11

growth linfinity (cm): 88

CV length age: 0.08

length maturity (cm) 34

wt (kg) at 100 cm: 11

growth tzero 0

Legal length 0

Sample individual survival for Na< 1000

Lorenzen survival

Prop of fisher sample

0 cm Fish length cm

Representation of parameter uncertainty

MSY min: 10000 MSY max: 500000

Umsy min: 0.05 Umsy max:: 0.5

S min: 0.84 S max:: 0.88

Size distn weight: .00000001

Age distn weight: .00000001

Use historical anomaly estimates

Var of abundance index: .04

Bycatch params

bycatch before compensation

0 future bycatch U

0.03 Szero

Sample distribution of Umsy and MSY values

500

MSY

10

0.05 Umsy 0.50

Prop of fisher sample

1 Age max

Min age fit: 1

11,002,316

Vul. B

B scaler: 0.2

Catch

Rec Anoms

U (C/N)

1965 Assume flat U for yrs: 0 to 0

Ubar 2003-2005

0 Compensation ratio 50

Current stock and harvest rate

P(overfishing) = 0.01

P(overfished) = 0.00

3

U/Umsy

1

EGG/EGGo (B/Bo)

East Region: SRA Interface

Stochastic SRA, parfile=tilefish_23.1_east uncer.par, datafile=Tilefish_23.1_East uncertain3.csv

Files

Run Priors | Stop

Show Posterior (SIR) Sample

N trials to run: 1000

Years to simulate (100 max): 50

Run MCMC sampling

Do MCMC sample

Par Step: .2

Anom Step: .1

Number of trials: 1000000

Trials: 2142152

Mean NPV: 4711.9

Prop. crashed: 0.00

Discount rate: 0.97

Parameters

Bhat 2009: 6000000 SD Bhat: 10000000

Uhat 2009: 0.1 SD Uhat 0.02

SD rec: 0.5

Recruitment autocorrelation rho: 0

Future TAC (kg): 1000 or Ufuture: 0.2

Sample individual survival for Na< 1000

growth von B K: 0.11

growth linfinity (cm): 88

CV length age: 0.08

length maturity (cm) 34

wt (kg) at 100 cm: 11

growth tzero 0

Legal length 0

Age at maturity (for SSB) 2

Lorenzen survival

Prop of fisher sample

0 cm Fish length cm

Representation of parameter uncertainty

MSY min: 10000 MSY max: 400000

Umsy min: 0.05 Umsy max:: 0.4

S min: 0.84 S max:: 0.88

Size distn weight: .00000001

Age distn weight: .00000001

Use historical anomaly estimates

Var of abundance index: .04

Bycatch params

bycatch before compensation

0 future bycatch U

0.03 Szero

Sample distribution of Umsy and MSY values

400

MSY

10

0.05 Umsy 0.40

Prop of fisher sample

1 Age max

Min age fit: 1

9,085,397.

Vul. B

B scaler: 0.2

Catch

Rec Anoms

U (C/N

1965 Assume flat U for yrs: 0 to 0

Ubar 2003-2005

0 Compensation ratio 50

Current stock and harvest rate

P(overfishing) = 0.01

P(overfished) = 0.00

3

U/Umsy

1

EGG/EGGo (B/Bo)

West Region: SRA Interface

Stochastic SRA, parfile=tilefish_23.1_west.par, datafile=Tilefish_23.1_West.csv

Files

Run Priors | Stop

Show Posterior (SIR) Sample

N trials to run: 1000

Years to simulate (100 max): 50

Run MCMC sampling

Do MCMC sample

Par Step: .2

Anom Step: .1

Number of trials: 1000000

Trials: 2213497

Mean NPV: 1718.2

Prop. crashed: 0.00

Discount rate: 0.97

Parameters

Bhat 2009: 6000000 SD Bhat: 10000000

Uhat 2009: 0.1 SD Uhat 0.02

SD rec: 0.5

Recruitment autocorrelation rho: 0

Future TAC (kg): 1000 or Ufuture: 0.2

Sample individual survival for Na< 1000

growth von B K: 0.17

growth linfinity (cm): 77

CV length age: 0.08

length maturity (cm) 34

wt (kg) at 100 cm: 11

growth tzero 0

Legal length 0

Age at maturity (for SSB) 2

Lorenzen survival

Prop of fisher sample

0 cm Fish length cm

Representation of parameter uncertainty

MSY min: 10000 MSY max: 200000

Umsy min: 0.05 Umsy max:: 0.5

S min: 0.84 S max:: 0.88

Size distn weight: .00000001

Age distn weight: .00000001

Use historical anomaly estimates

Var of abundance index: .04

Bycatch params

bycatch before compensation

0 future bycatch U

0.03 Szero

Sample distribution of Umsy and MSY values

200

MSY

10

0.05 Umsy 0.50

Prop of fisher sample

1 Age max

Min age fit: 1

1,967,889.1

Vul. B

B scaler: 0.1

Catch

Rec Anoms

U (C/N

1978 Assume flat U for yrs: 0 to 0

Ubar 2003-2005

0 Compensation ratio 50

Current stock and harvest rate

P(overfishing) = 0.00

P(overfished) = 0.09

3

U/Umsy

1

EGG/EGGo (B/Bo)

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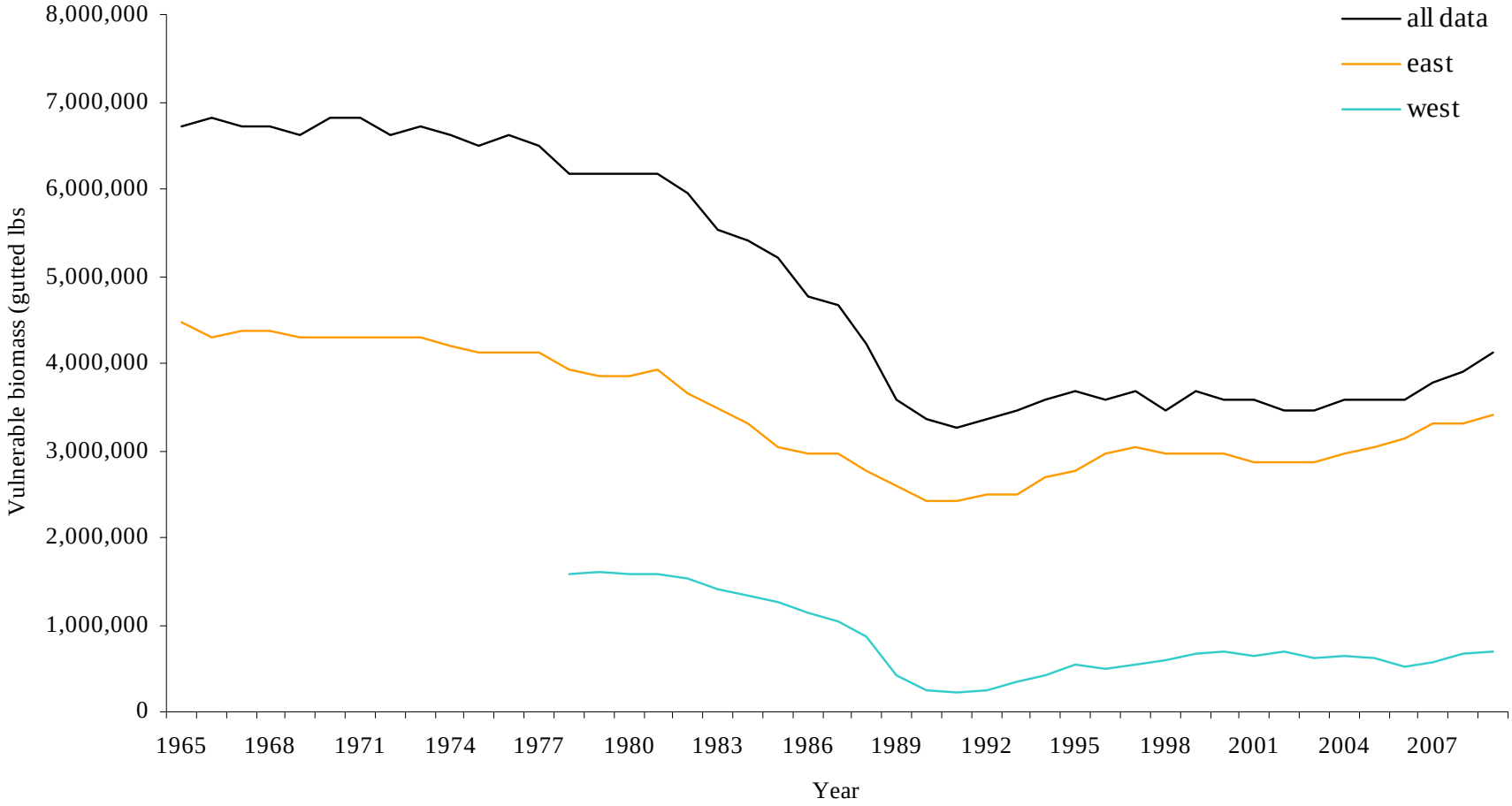
Model Results: Vulnerable Biomass



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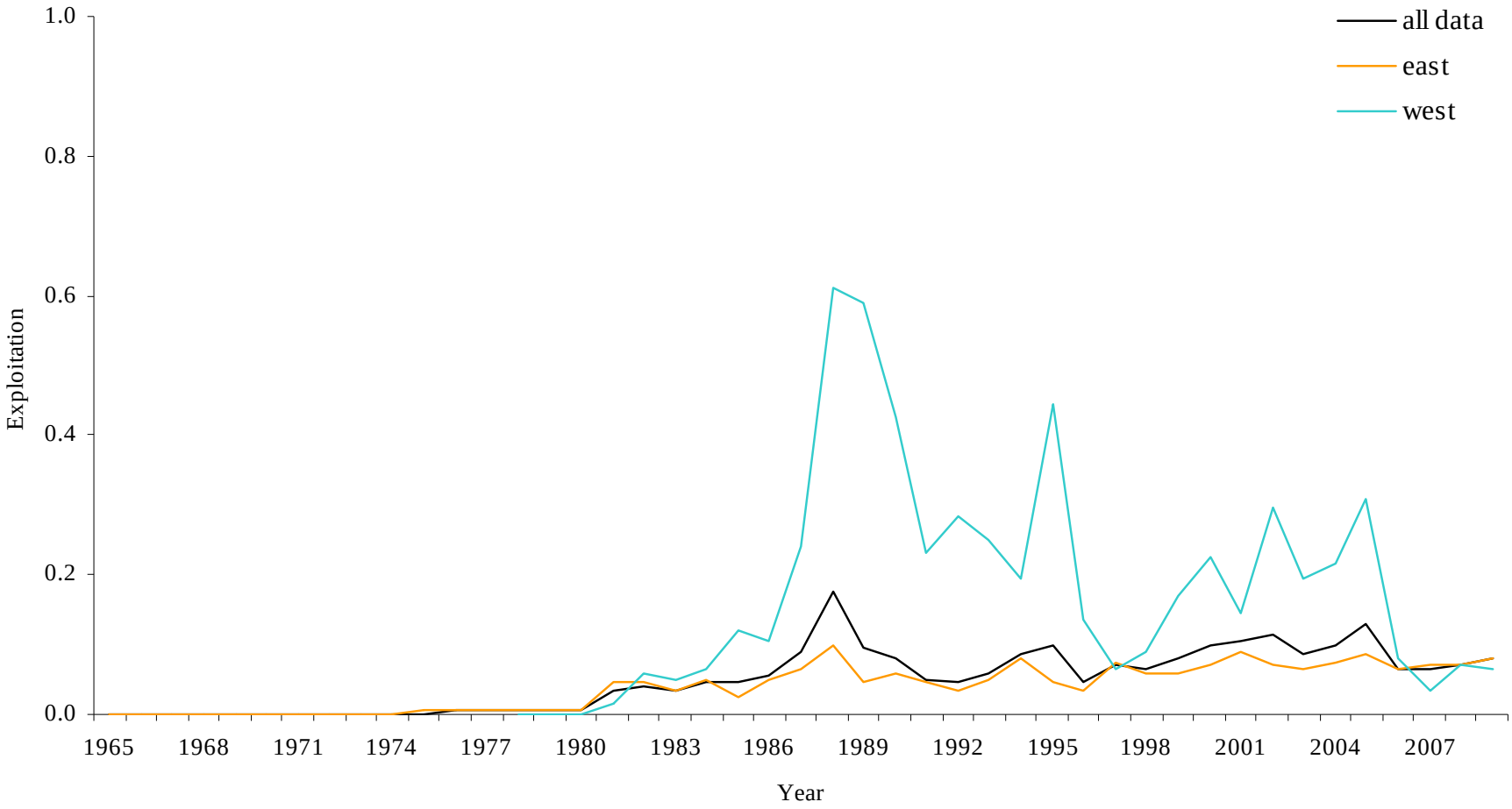
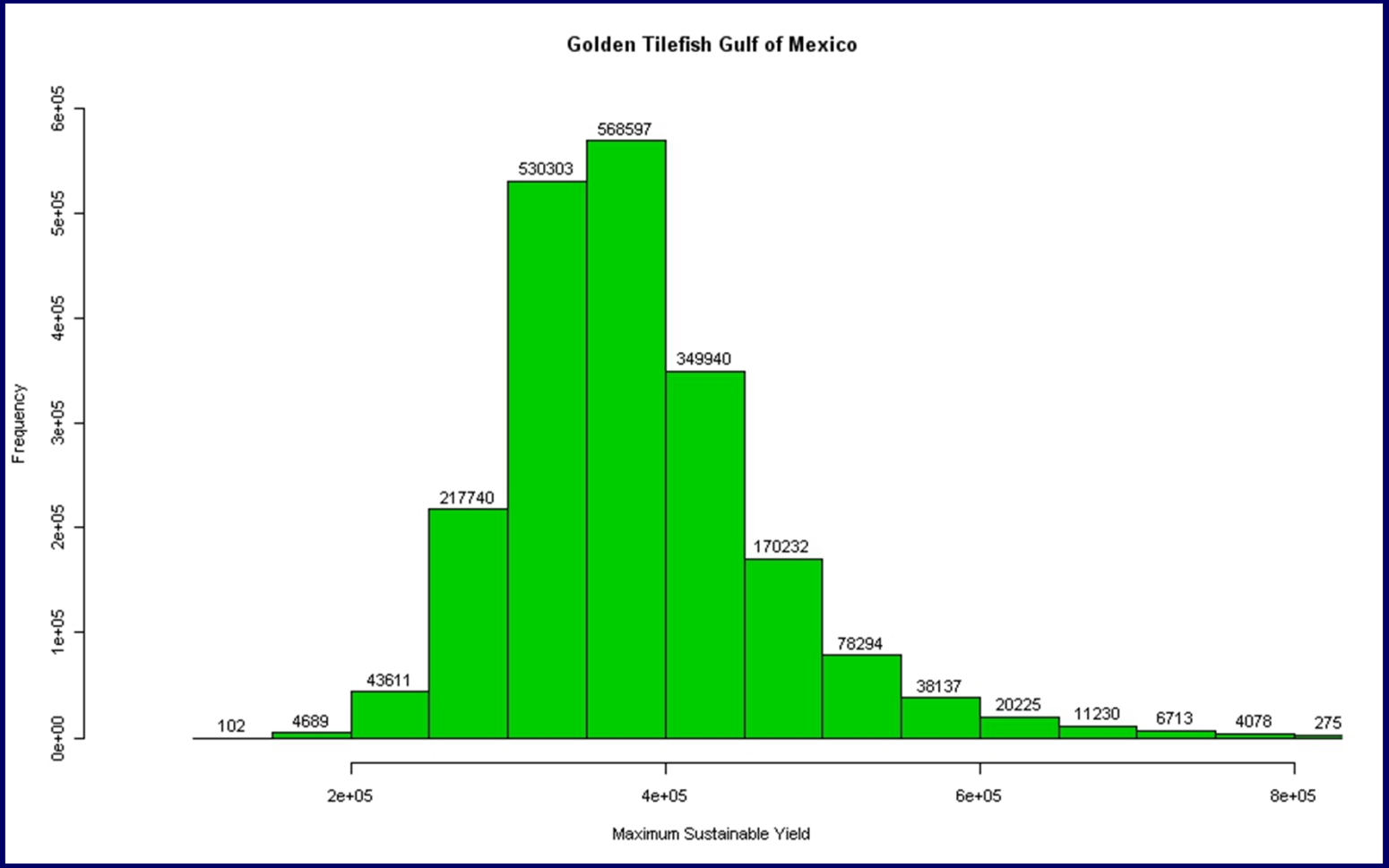
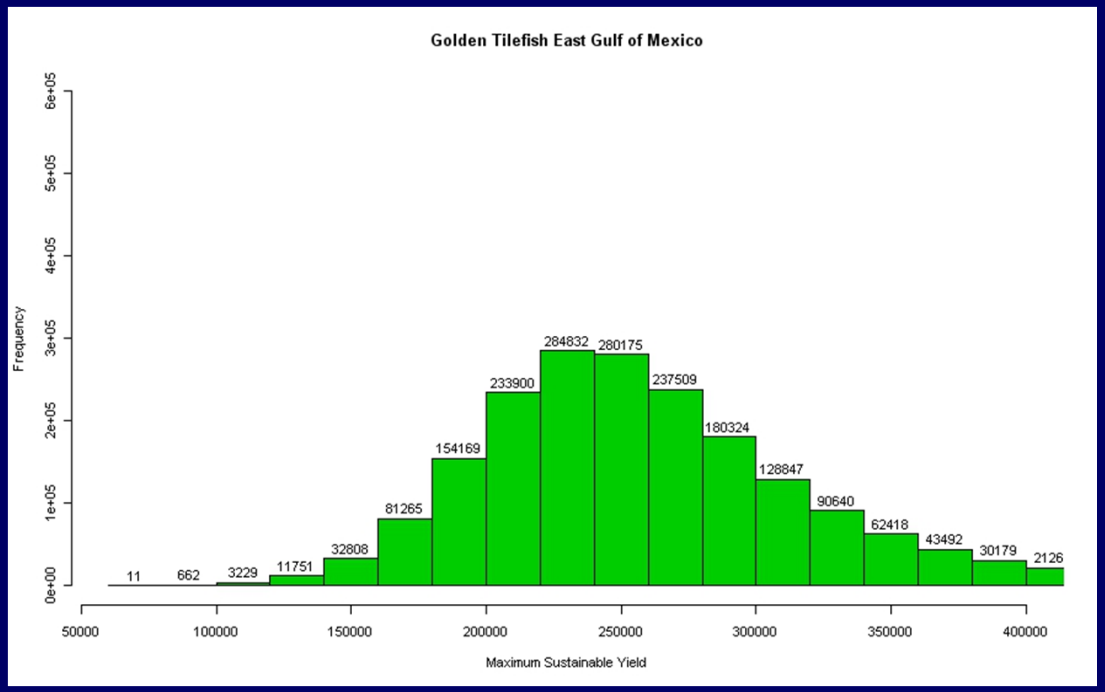
Model Results: Exploitation

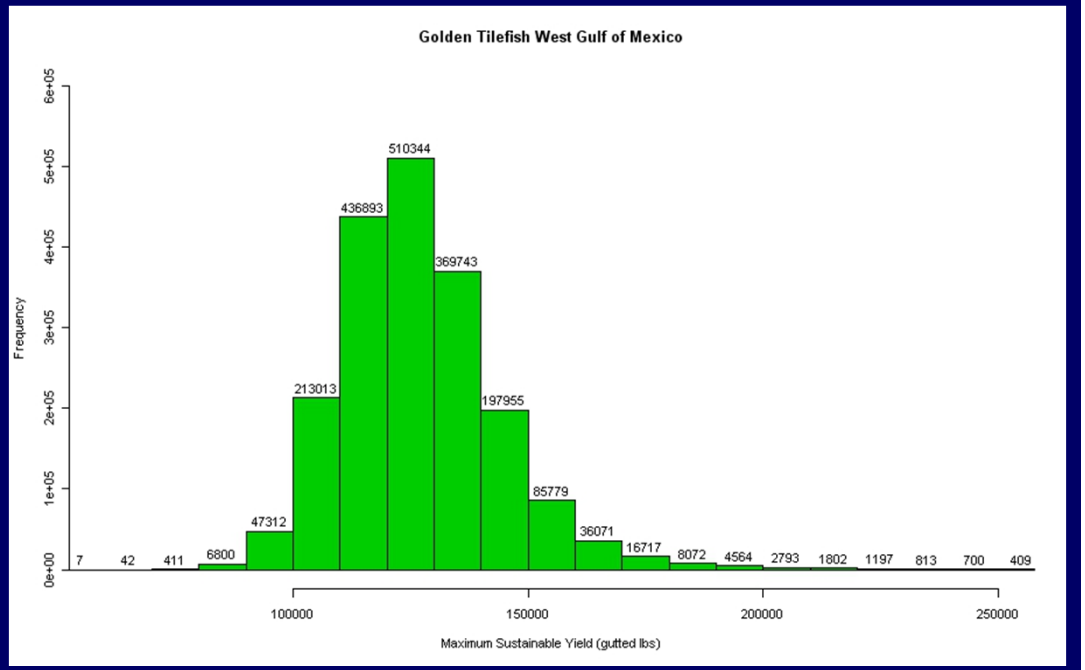


Model Results: MSY

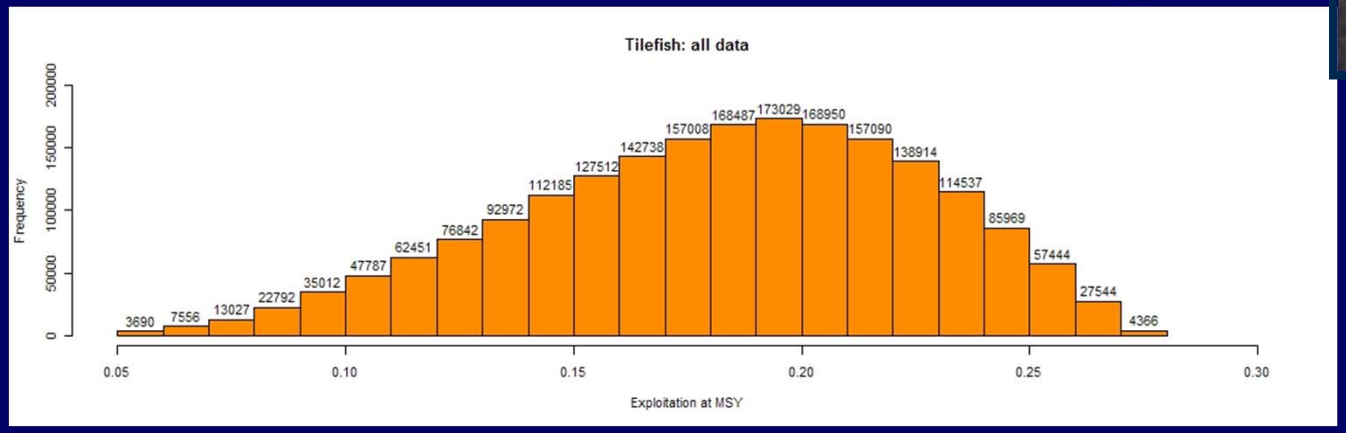


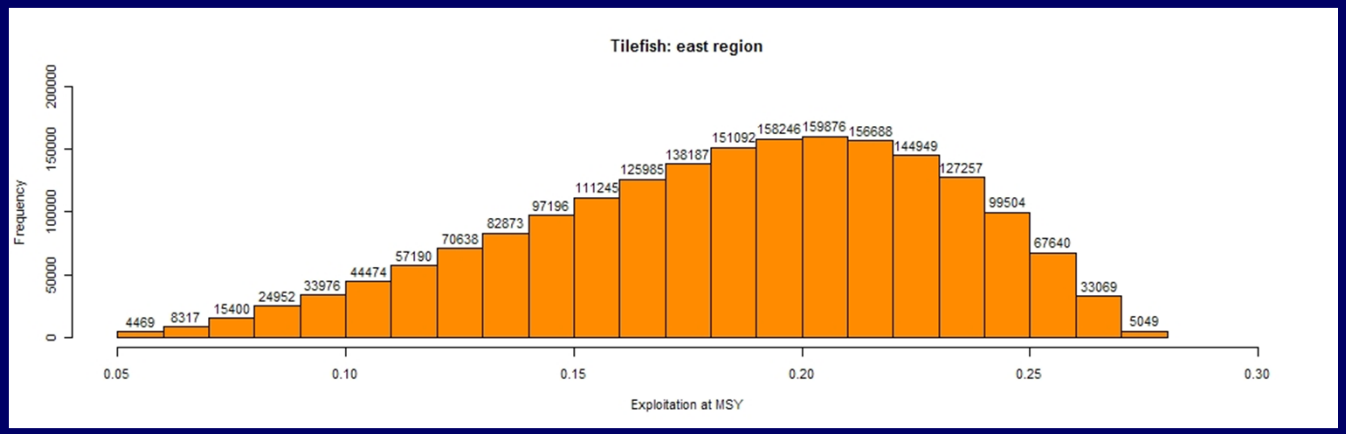


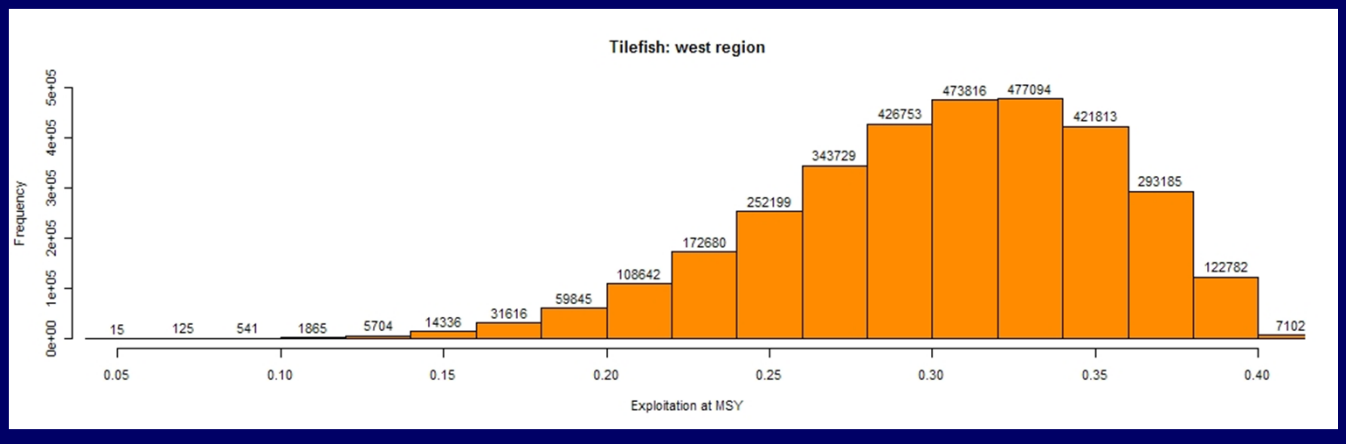
Model Results: MSY



Model Results: Umsy

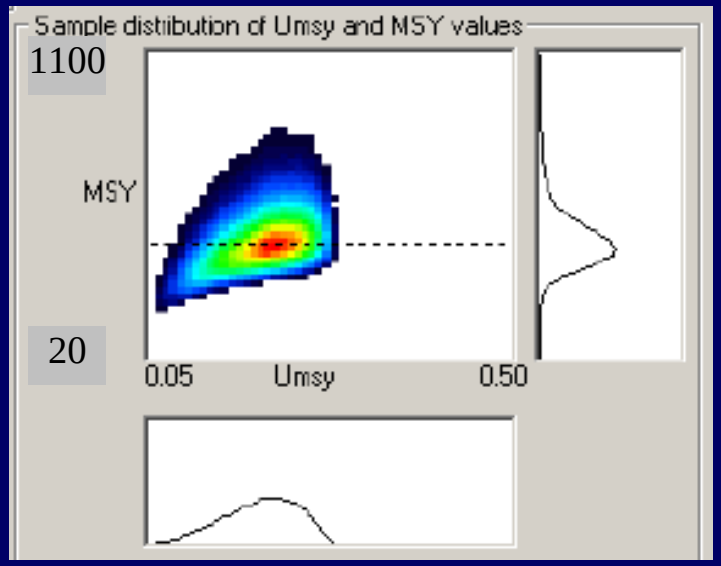




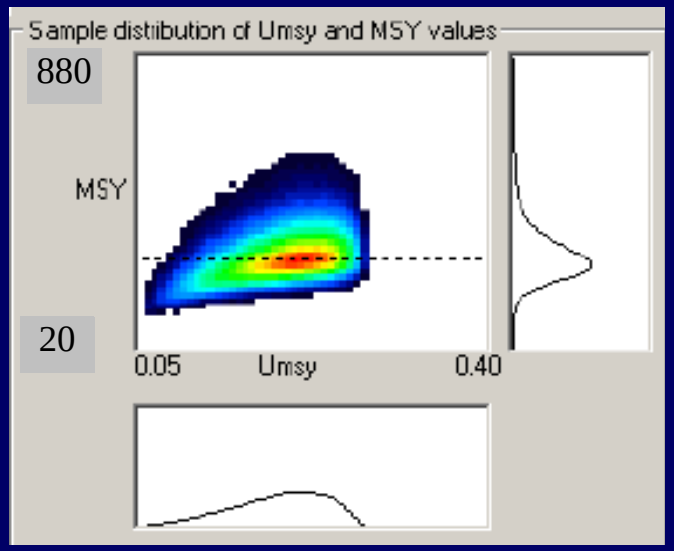


Model Results: Distribution MSY and Umsy

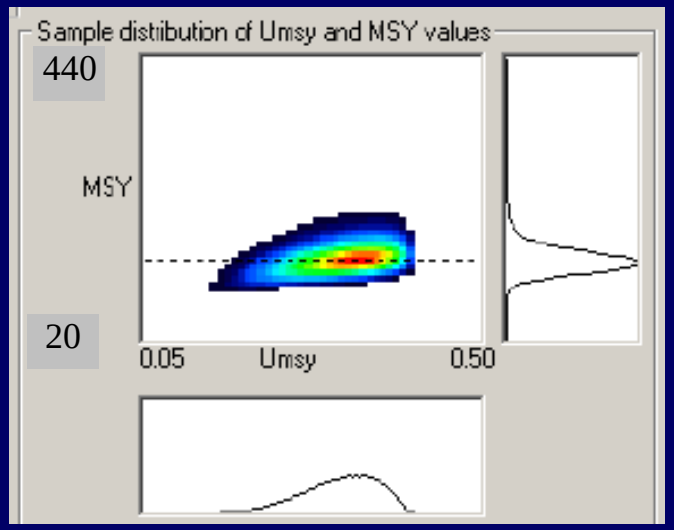
All data



East

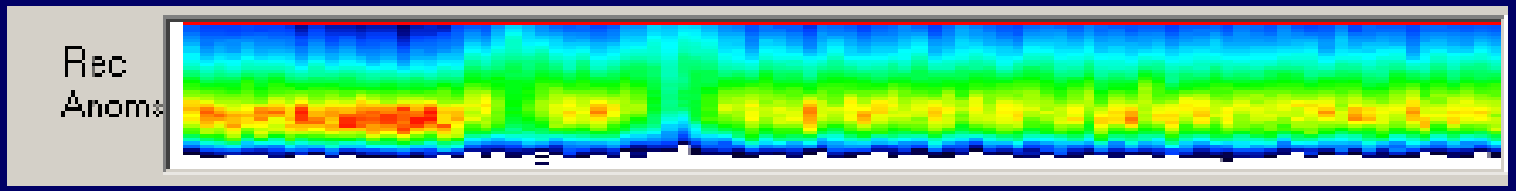


West

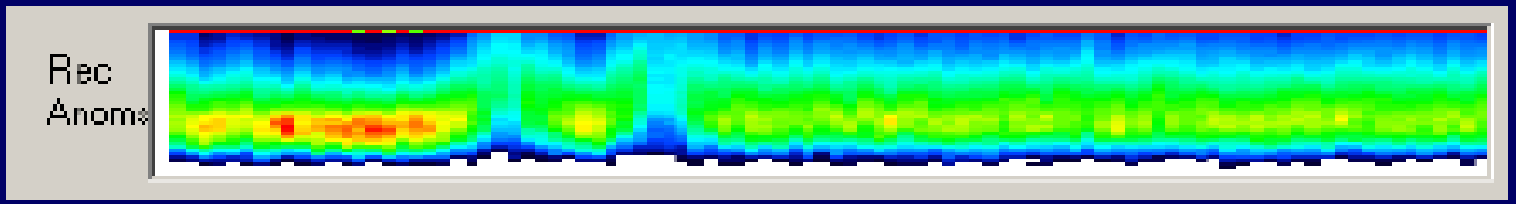


Model Results: Recruitment Anomalies

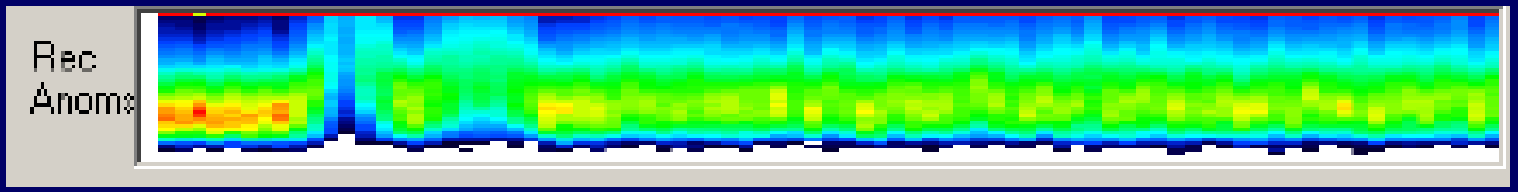
All data



East

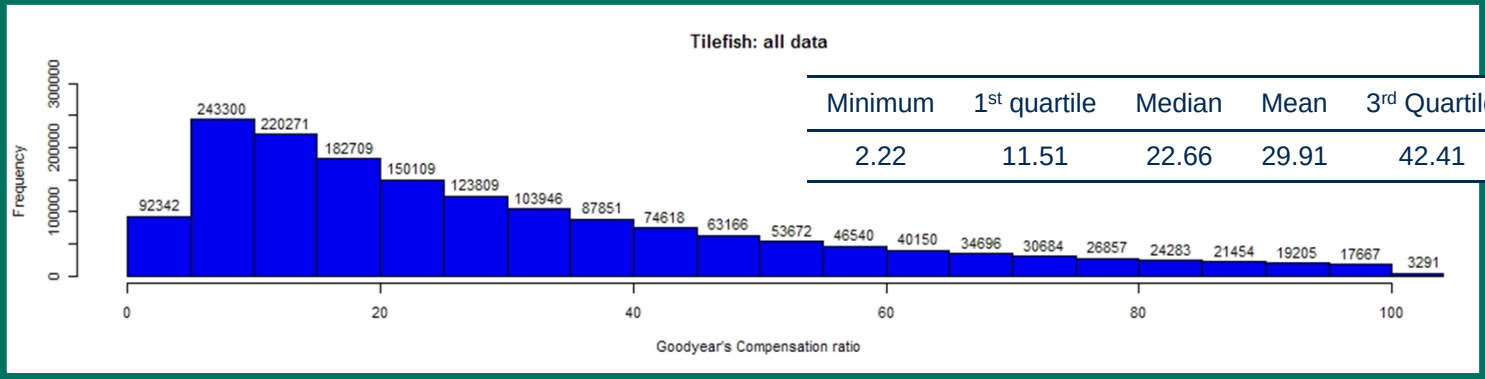


West

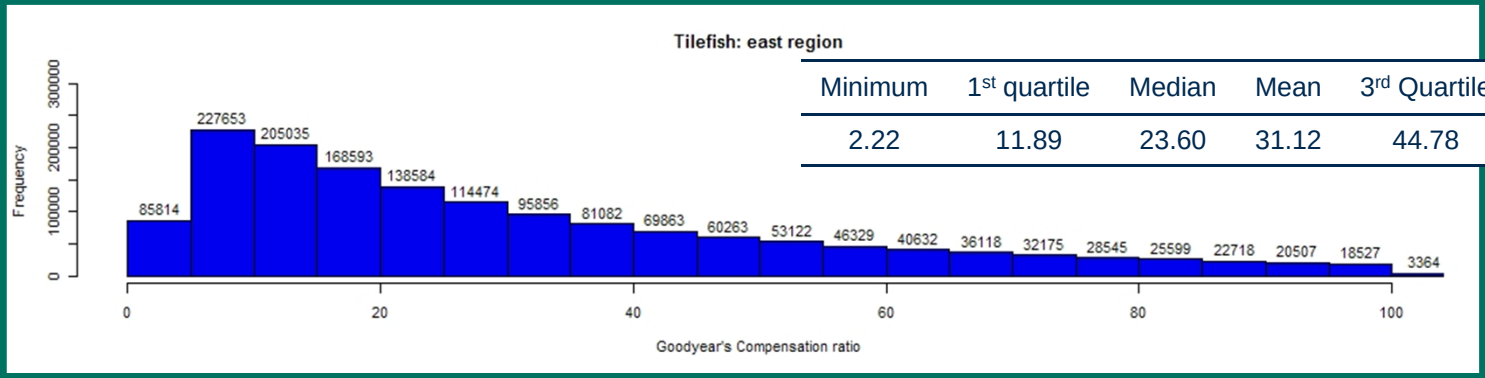


Note: the time series began in 1965 for the east and in 1978 for the west.

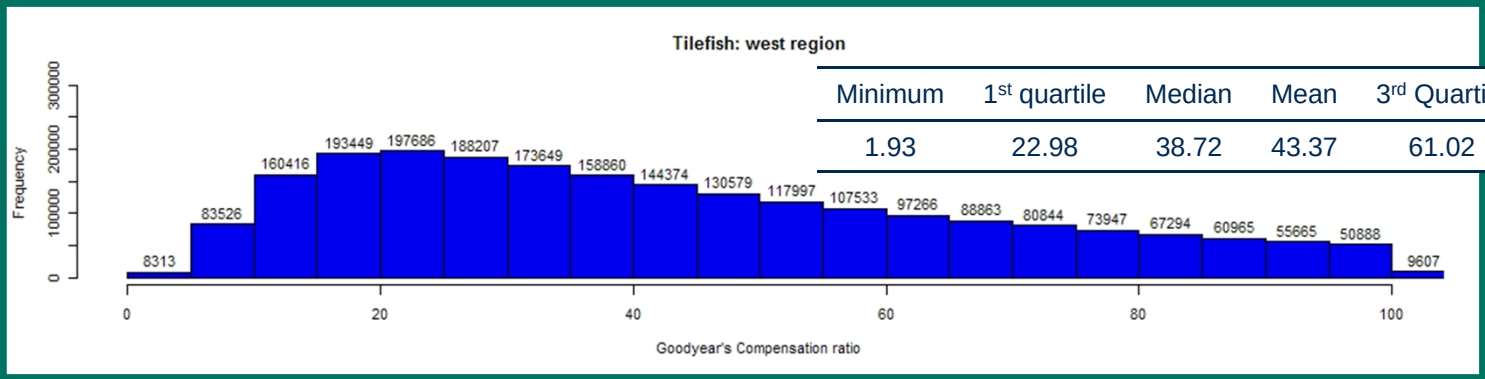
Model Results: Goodyear's Recruitment Compensation Ratio



Minimum	1st quartile	Median	Mean	3rd Quartile	Maximum
2.22	11.51	22.66	29.91	42.41	101

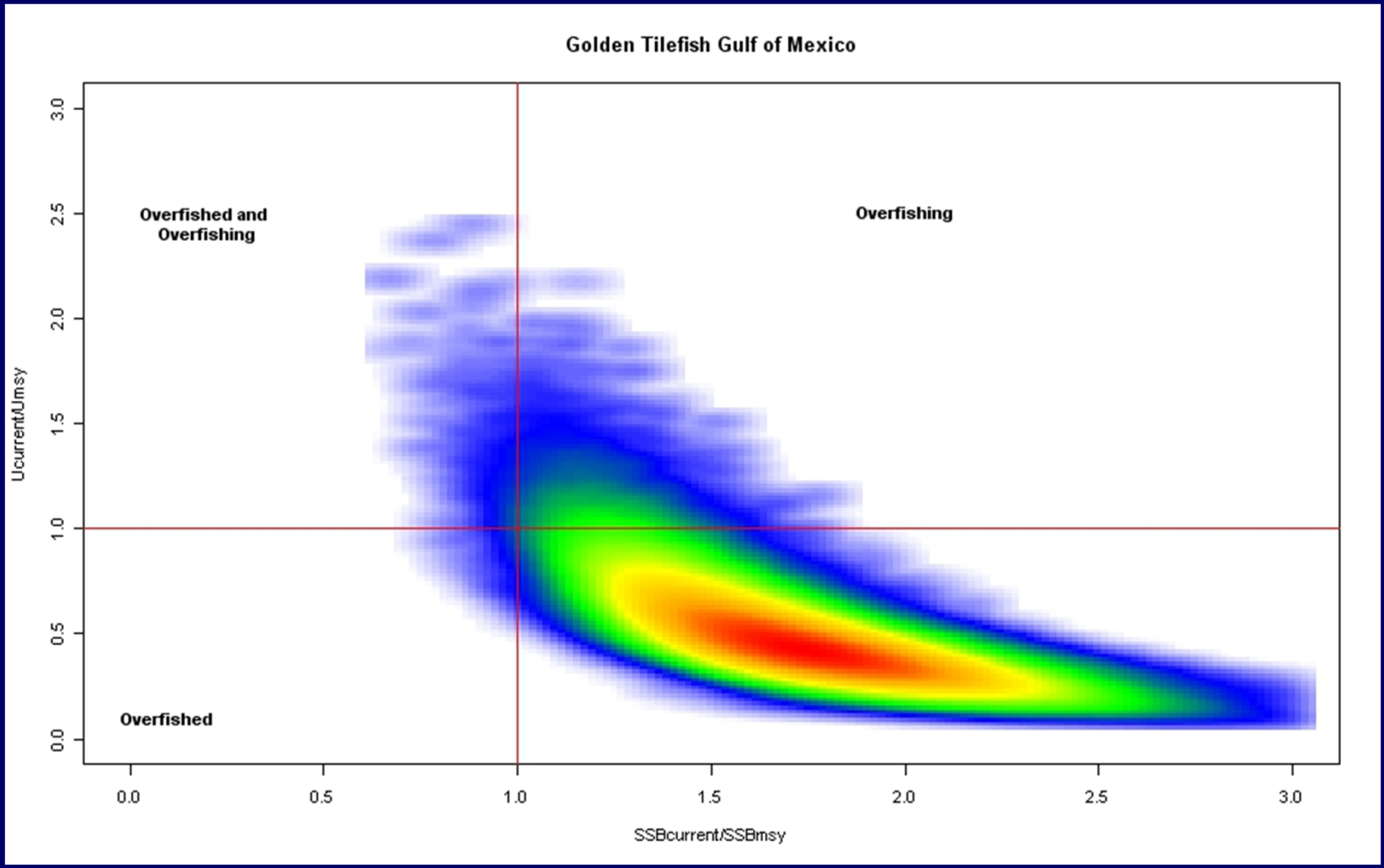


Minimum	1st quartile	Median	Mean	3rd Quartile	Maximum
2.22	11.89	23.60	31.12	44.78	101.00



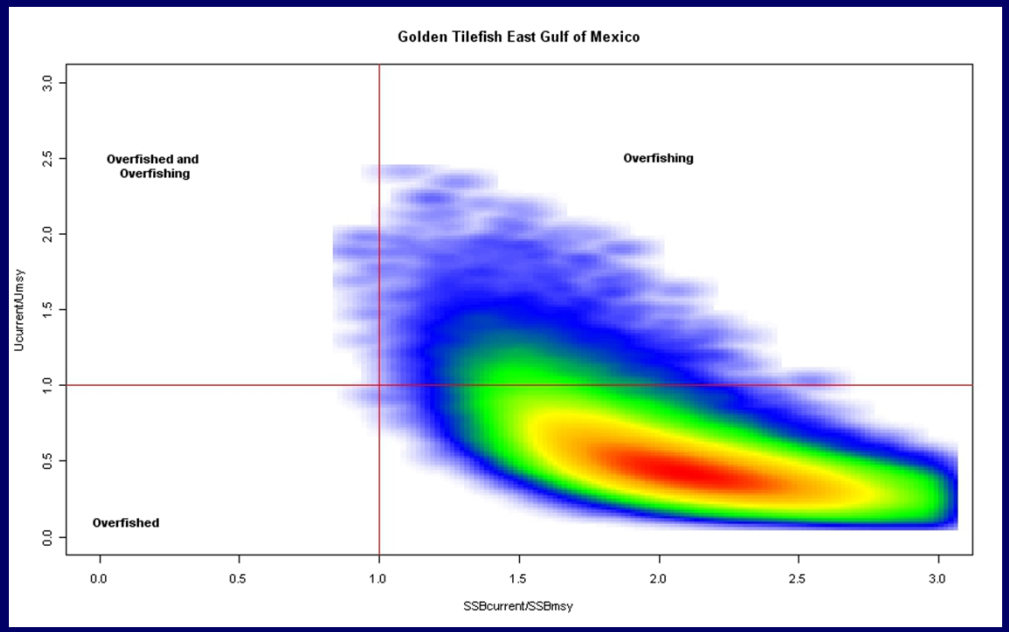
Minimum	1st quartile	Median	Mean	3rd Quartile	Maximum
1.93	22.98	38.72	43.37	61.02	101

Model Results: Gulf of Mexico Current Stock Status

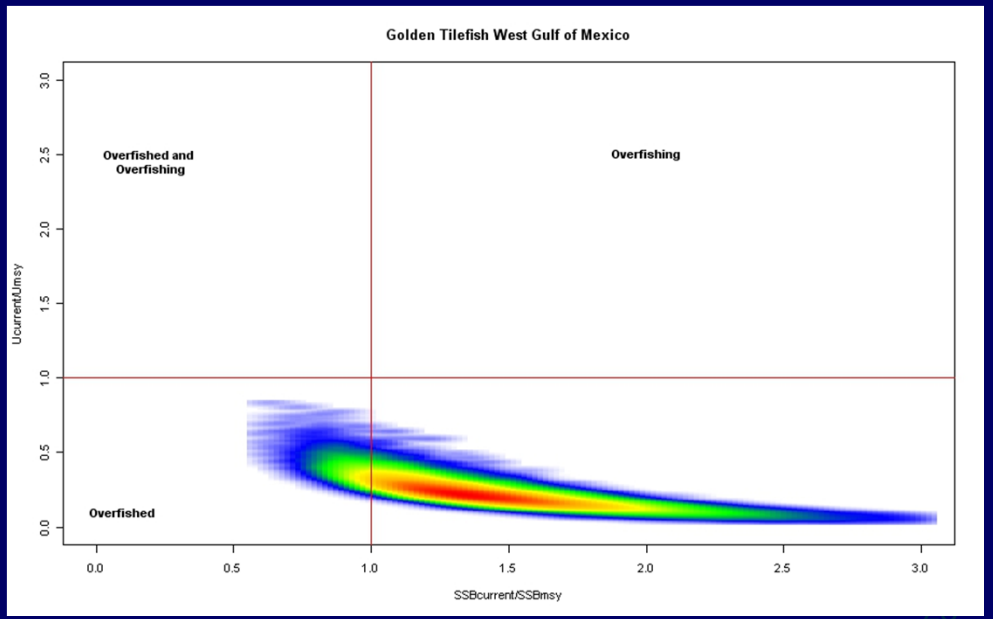


Model Results: Stock Status by Region

East

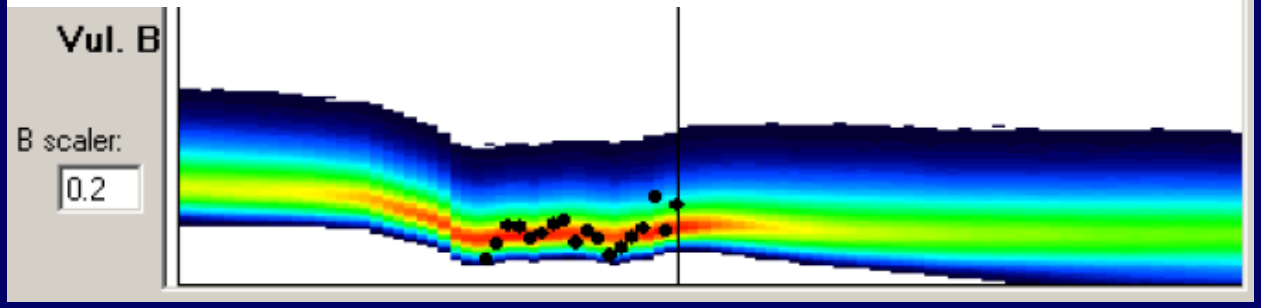


West



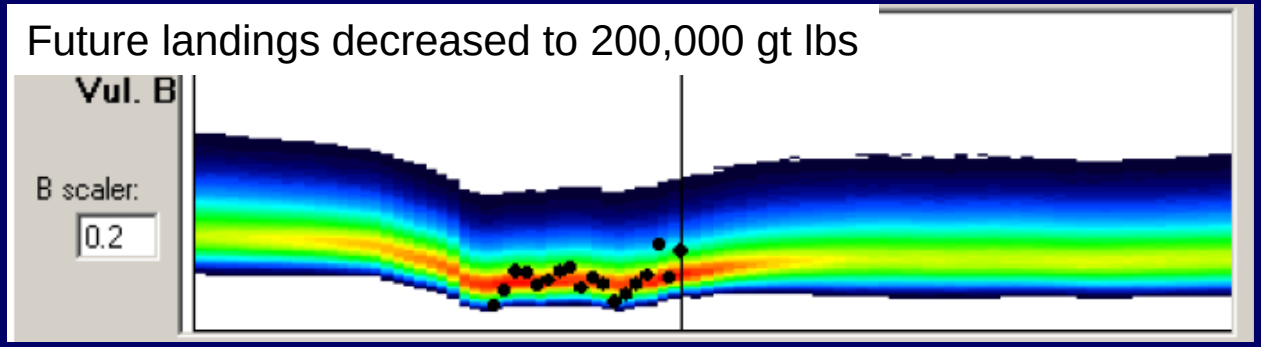
Model Results: Future Projections

Future landings kept the same 400,000 gt lbs



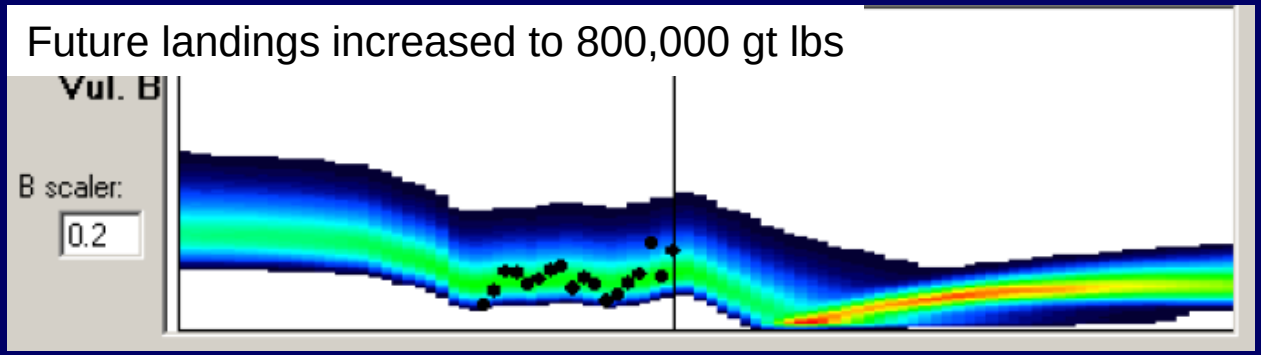
Probability population crash = 0.10

Future landings decreased to 200,000 gt lbs



Probability population crash = 0.00

Future landings increased to 800,000 gt lbs



Probability population crash = 0.83

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Tilefish Summary Gulf of Mexico

Model	Minimum	1st quartile	Median	Mean	3rd Quartile	Maximum
MSY*	128,200	326,300	368,400	381,700	420,700	984,100
Umsy	0.05	0.15	0.19	0.18	0.22	0.28
Ucurrent	0.01	0.07	0.08	0.08	0.09	0.18
U2009/Umsy	0.08	0.35	0.44	0.47	0.55	2.45
recK (values >0)	2.22	13.37	29.01	287.00	65.52	5.16 e+7
recK (values 0-101)	2.22	11.51	22.66	29.91	42.41	101
Biomass 2009*	2,653,376	4,869,772	5,653,187	6,113,788	6,771,227	47,142,700
SSB 2009*	2,645,503	4,861,898	5,645,314	61,059,146	6,763,353	47,123,016
SSB msy*	1,761,700	2,942,728	3,354,119	3,545,052	3,915,108	23,463,089
SSB2009/SSBmsy	0.67	1.55	1.73	1.74	1.92	3.48

*gutted pounds

Overfished = 0.11 %, Overfishing = 1.26 %

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Tilefish Summary
East Gulf of Mexico

Model	Minimum	1st quartile	Median	Mean	3rd Quartile	Maximum
MSY*	74,220	217,600	251,900	264,000	294,800	787,300
Umsy	0.05	0.15	0.19	0.19	0.22	0.28
Ucurrent	0.01	0.07	0.08	0.08	0.10	0.19
U2009/Umsy	0.07	0.35	0.44	0.47	0.56	2.41
recK (values > 0)	2.22	14.03	31.13	271.3	72.74	4.54 e+7
recK (values 0 – 101)	2.22	11.89	23.60	31.12	44.78	101.00
Biomass 2009*	2,153,408	3,989,906	4,653,250	5,066,610	5,613,820	48,205,625
SSB 2009*	2,149,471	3,984,001	4,647,345	5,060,705	5,605,946	48,146,573
SSB msy*	1,023,754	1,956,373	2,275,447	2,430,949	2,710,459	20,608,938
SSB2009/SSBmsy	0.91	1.87	2.07	2.09	2.30	4.11

*gutted pounds

Overfished = 0.00 %, Overfishing = 1.65 %

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Tilefish Summary West Gulf of Mexico

Model	Minimum	1st quartile	Median	Mean	3rd Quartile	Maximum
MSY*	59,660	115,500	125,100	127,100	136,000	393,200
Umsy	0.05	0.27	0.31	0.30	0.34	0.41
Ucurrent	0.004	0.05	0.07	0.07	0.08	0.15
U2009/Umsy	0.02	0.18	0.22	0.22	0.26	0.83
recK (values > 0)	1.93	29.18	56.94	332.10	119.80	1.02 e+7
recK (values 0 – 101)	1.93	22.98	38.72	43.37	61.02	101
Biomass 2009*	537,761	975,923	1,124,929	1,201,696	1,328,656	16,380,858
SSB 2009*	534,218	971,396	1,120,205	1,196,775	1,323,342	16,325,743
SSB msy*	529,888	764,322	830,066	853,883	913,131	7,322,373
SSB2009/SSBmsy	0.61	1.20	1.36	1.39	1.55	3.37

*gutted pounds

Overfished = 4.12%, Overfishing = 0.00%