Application of Huynh 2020 Interim Analysis methods to assessed stocks from the US South Atlantic

Nikolai Klibansky

07 March, 2022

Built in performance metrics (PMs)

- `P10` Probability B > 0.1 BMSY
- `P50` Probability B > 0.5 BMSY
- `P100` Probability B > BMSY
- `PNOF` Probability F < FMSY
- `LTY` Probability Long-Term Yield > 0.5 Relative Yield
- `STY` Probability Short-Term Yield > 0.5 Relative Yield
- `AAVY` Probability AAVY < 0.2 (Average Annual Variability in Yield)
- `AAVE` Probability AAVE < 0.2 (Average Annual Variability in Effort)
- `Yield` Average Yield (relative to Reference Yield)
- can easily vary reference values and years
- PMs compute probabilities across years for each simulation and return mean values across simulations (but we could recompute them however we want from the raw MSE objects)

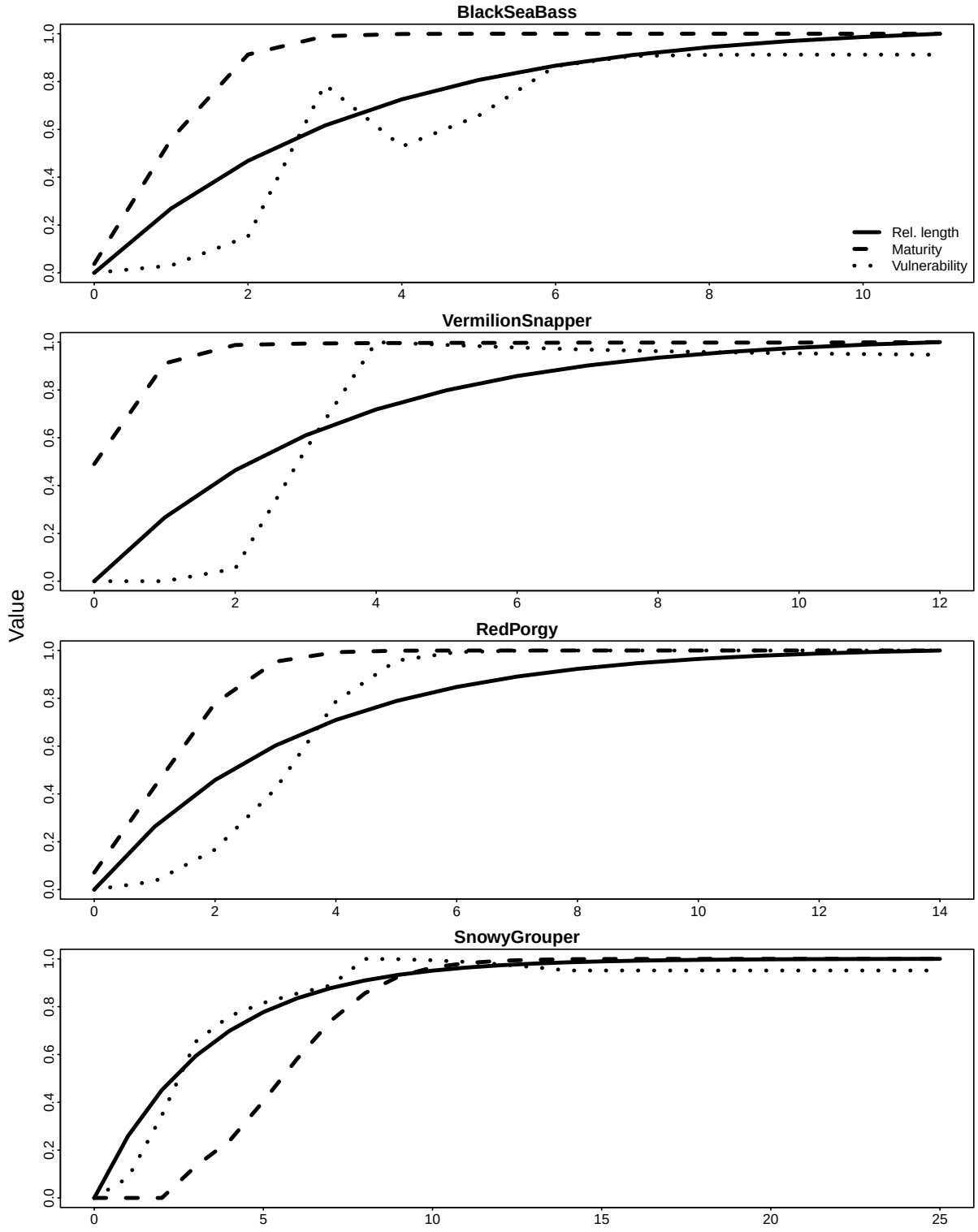


Figure 1: Life history (growth and maturity) and vulnerability schedules at age used in the operating models during the projection period BlackSeaBass, VermilionSnapper, RedPorgy, and SnowyGrouper. Growth is expressed as mean length-at-age relative to that at the maximum age.

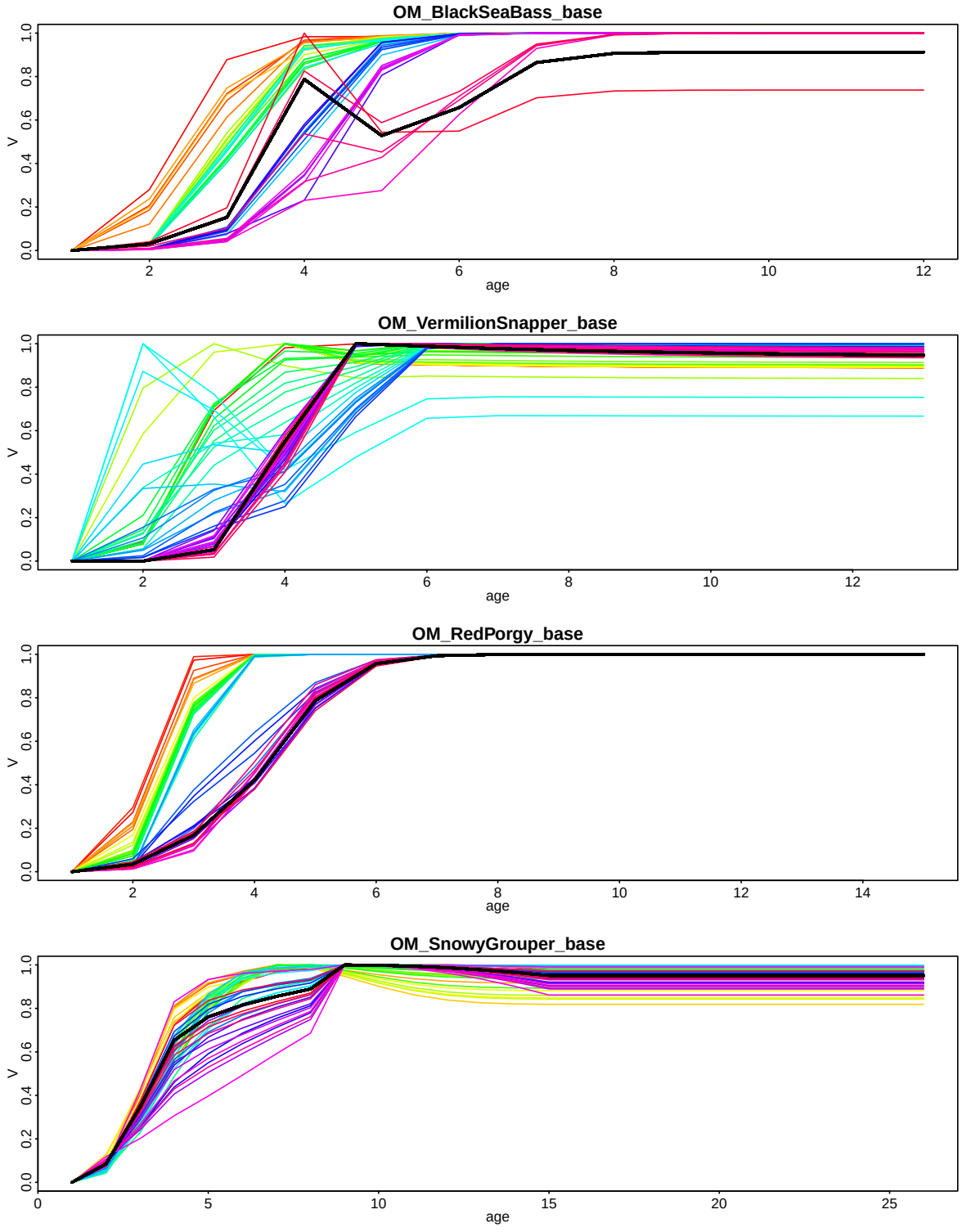


Figure 2: Vulnerability schedules at age used in the operating models during the historical period (colored lines in rainbow order) and projection period (black lines)BlackSeaBass, VermilionSnapper, RedPorgy, and SnowyGrouper. Growth is expressed as mean length-at-age relative to that at the maximum age.

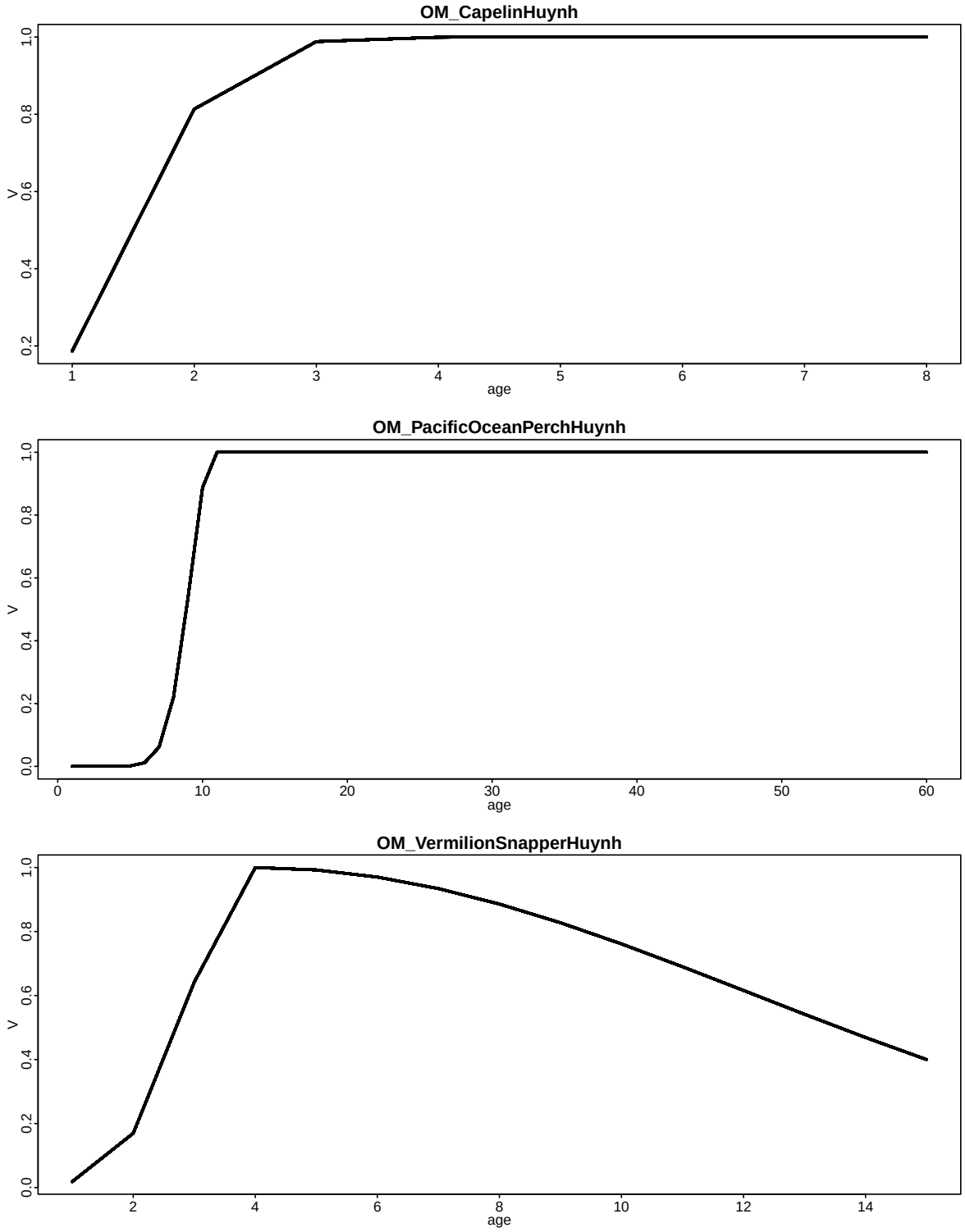
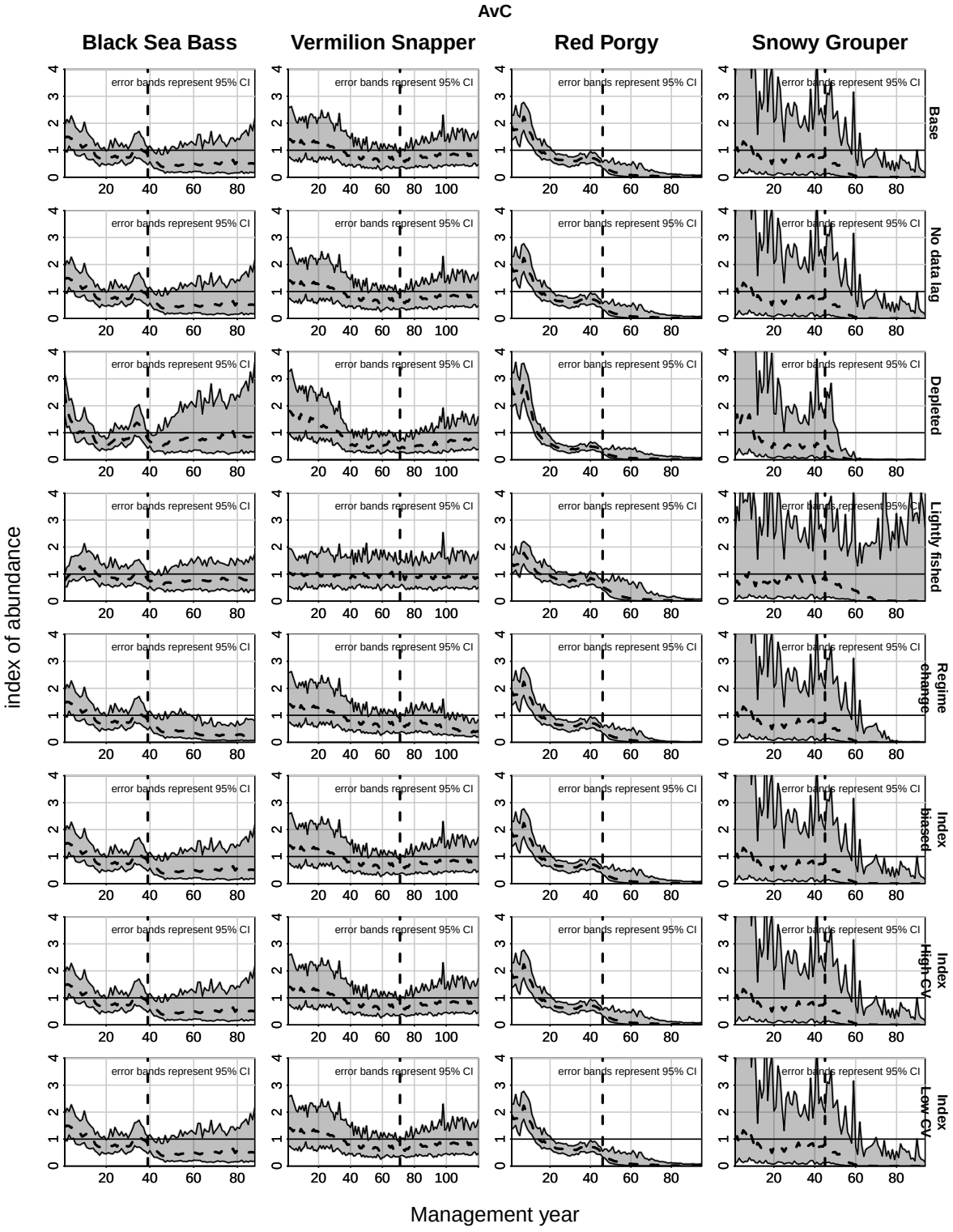
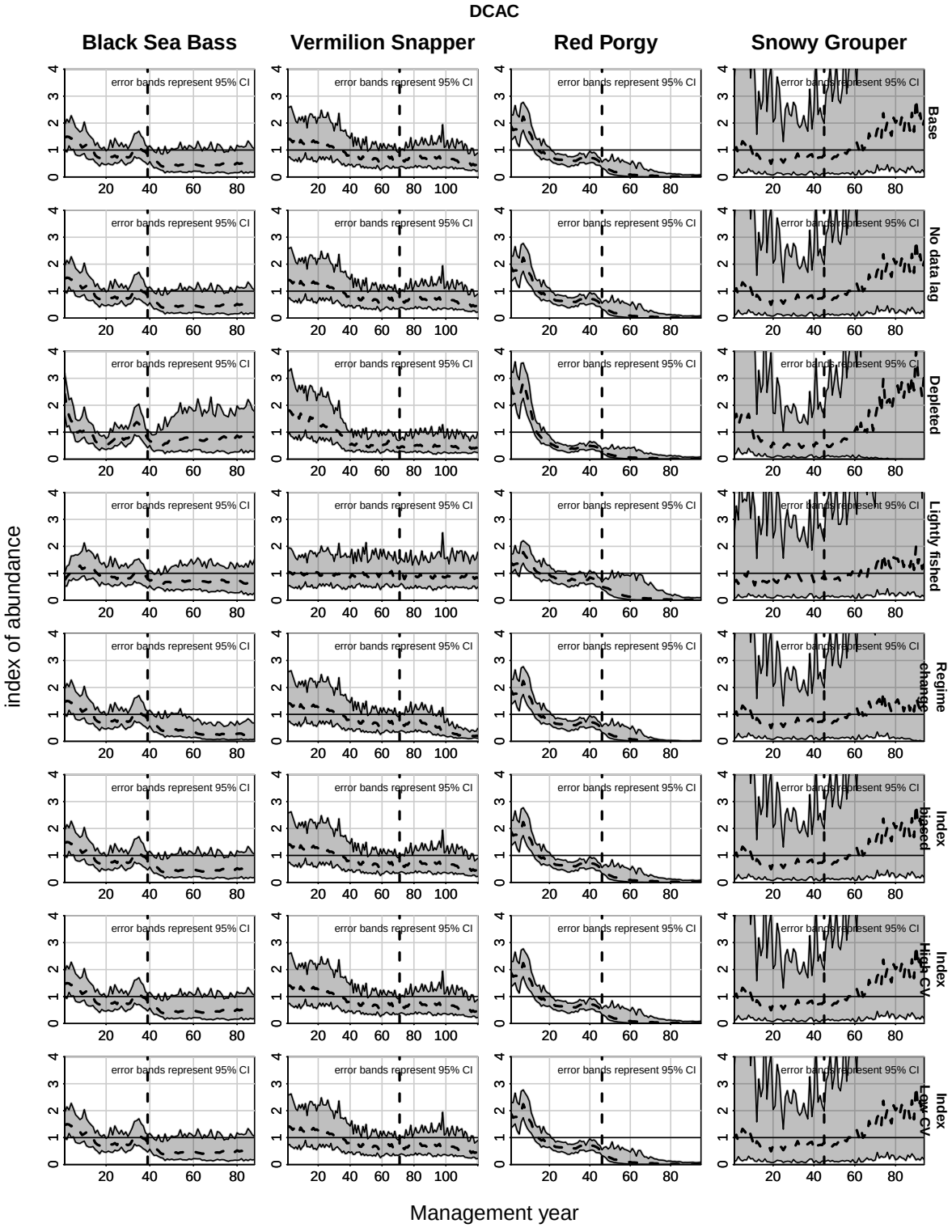
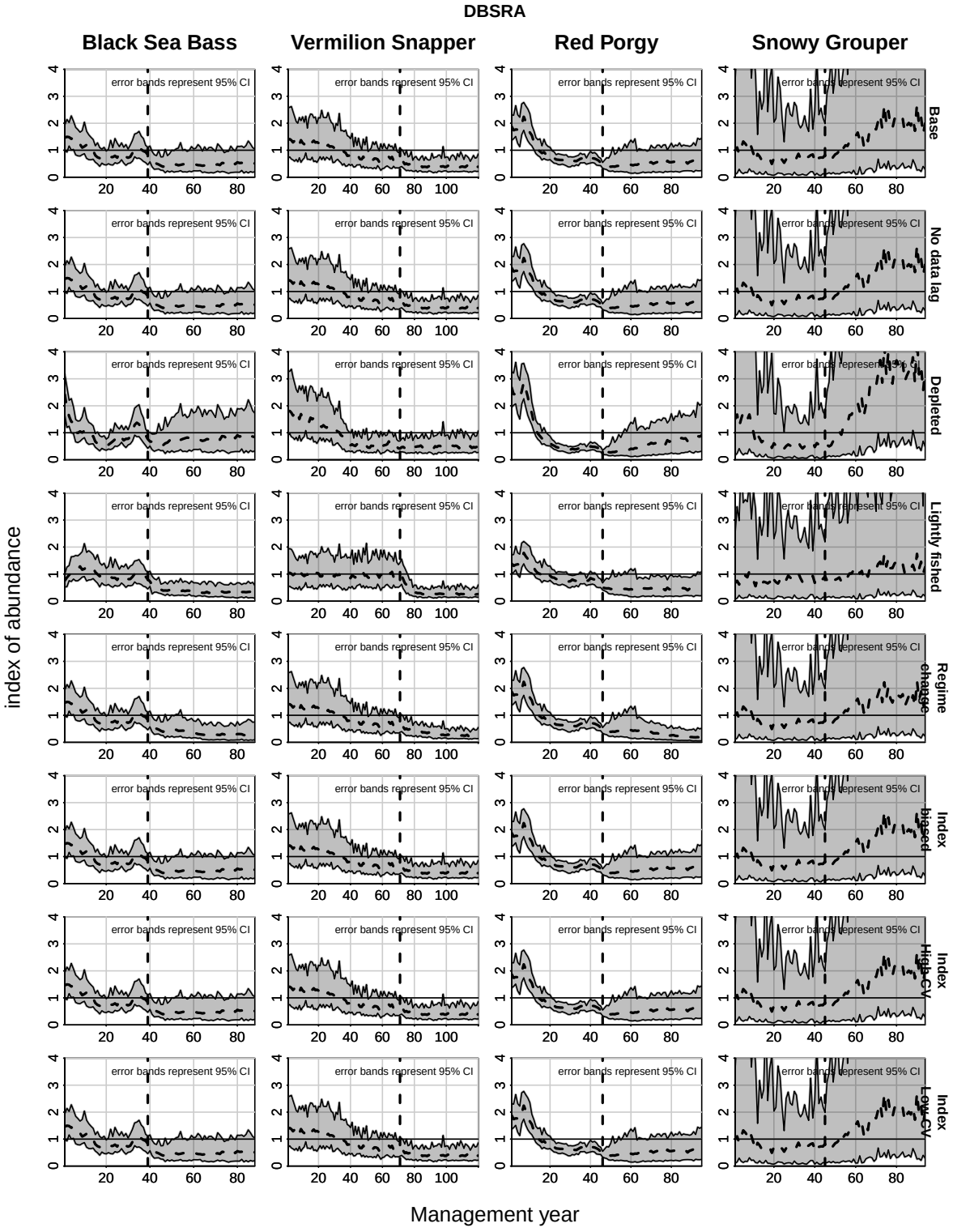
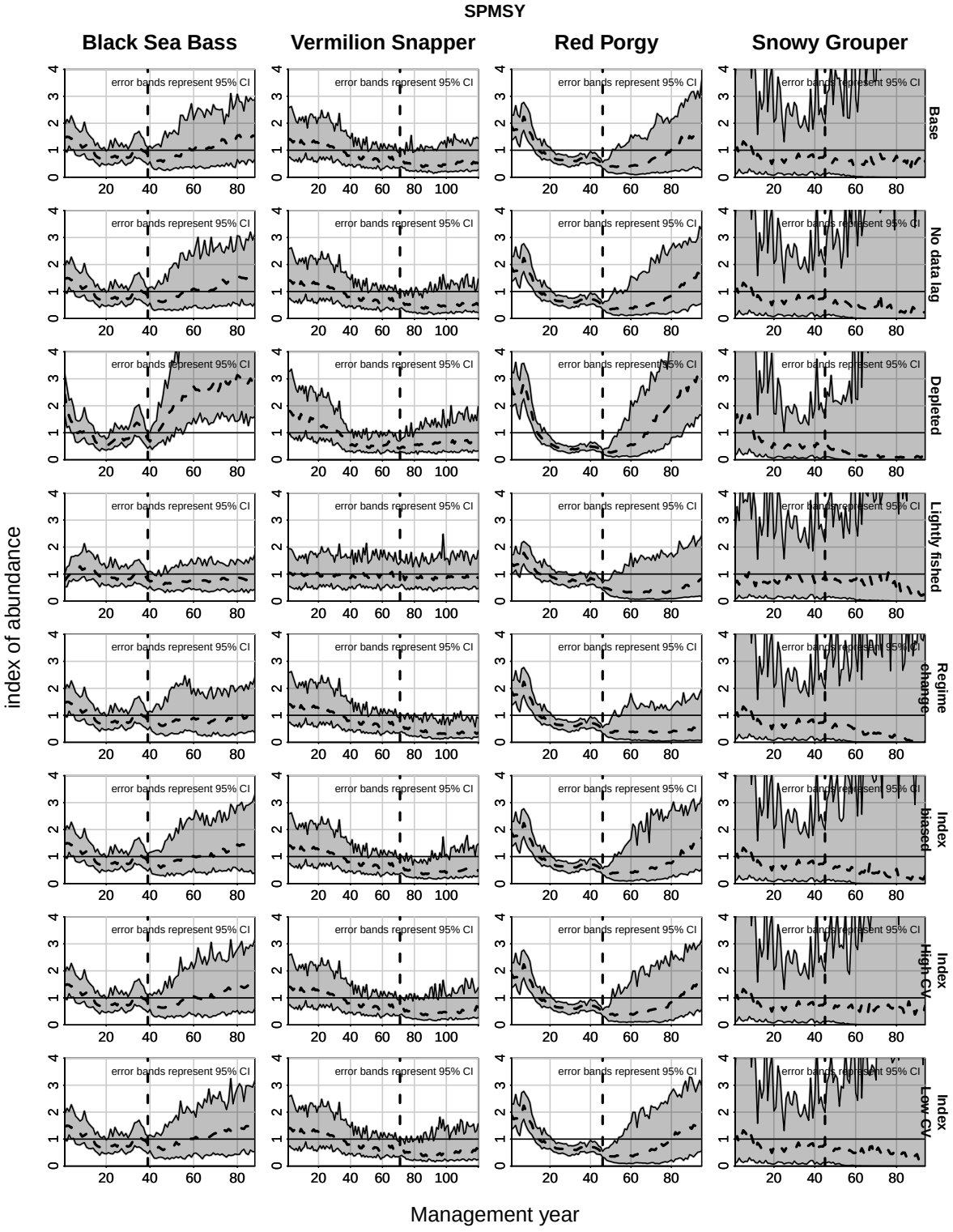


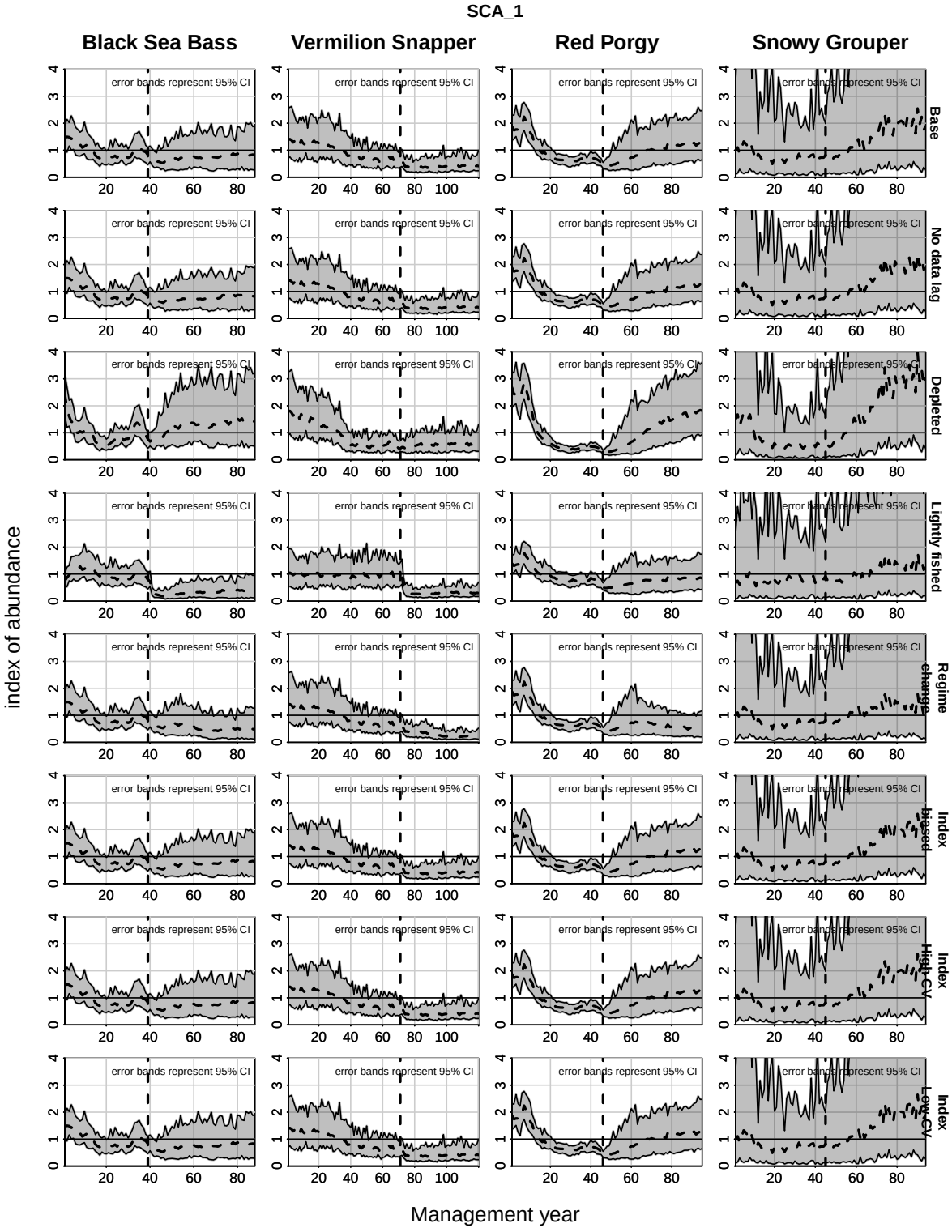
Figure 3: Vulnerability schedules at age used in the operating models during the historical period (colored lines in rainbow order) and projection period (black lines)CapelinHuynh, PacificOceanPerchHuynh, and VermilionSnapperHuynh. Growth is expressed as mean length-at-age relative to that at the maximum age.

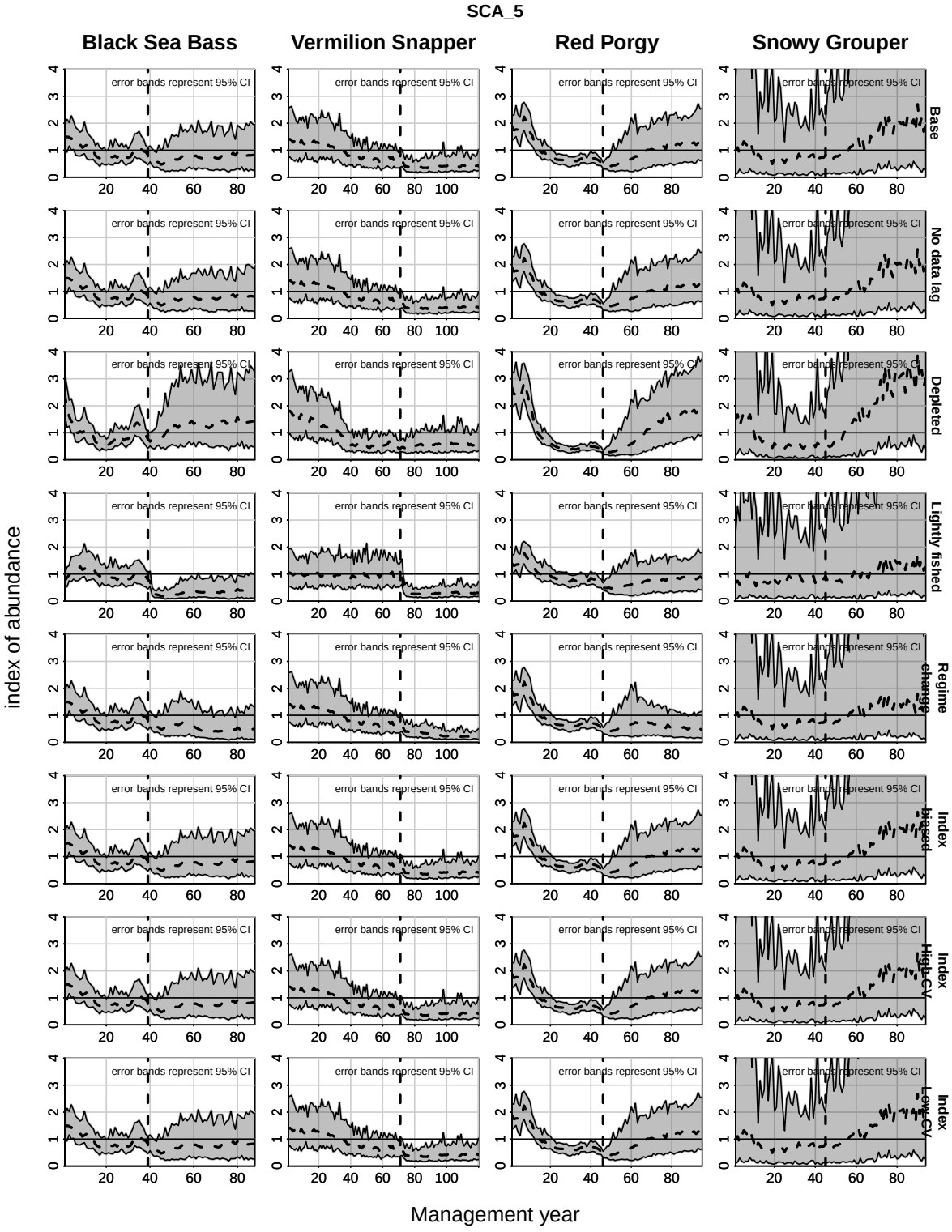

AvC
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

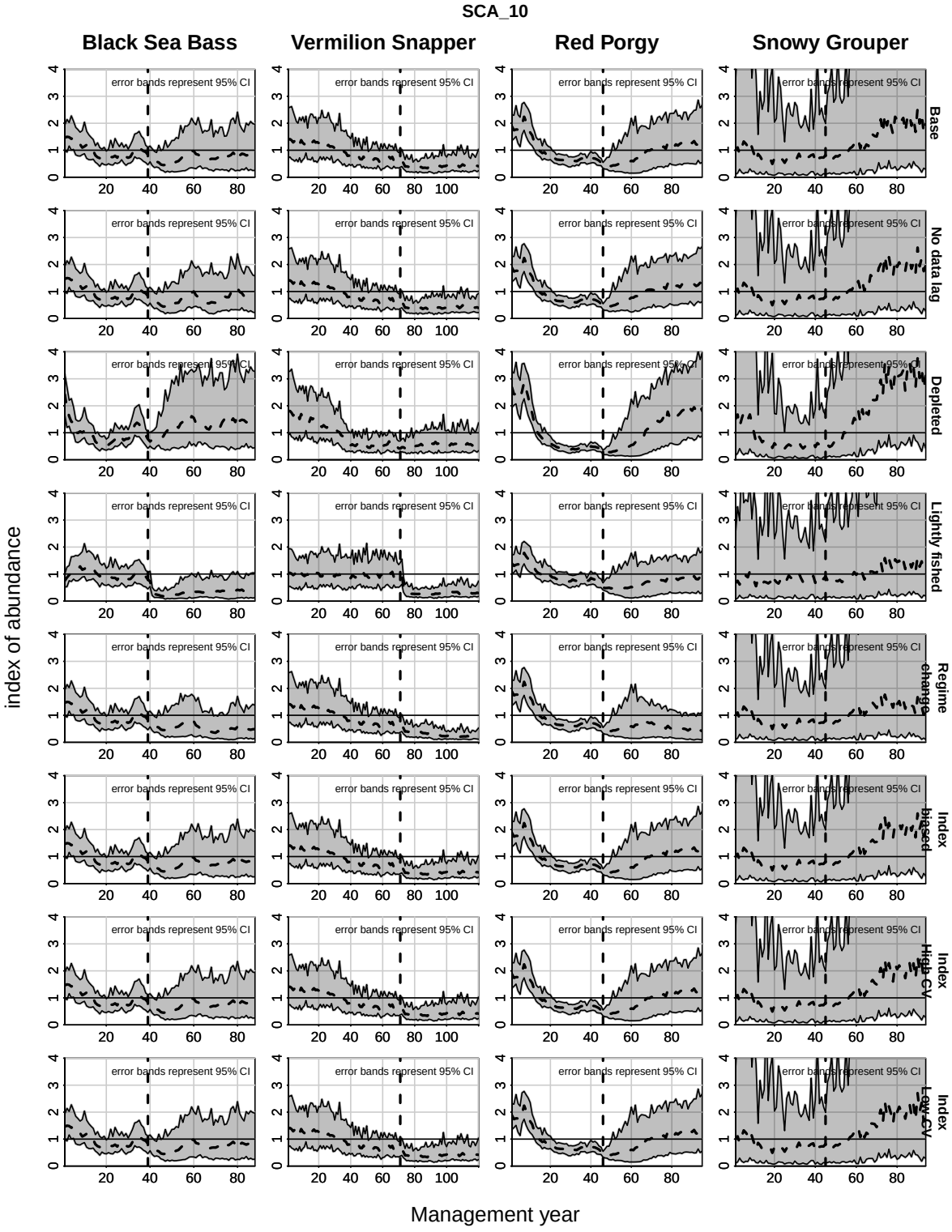

DCAC
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

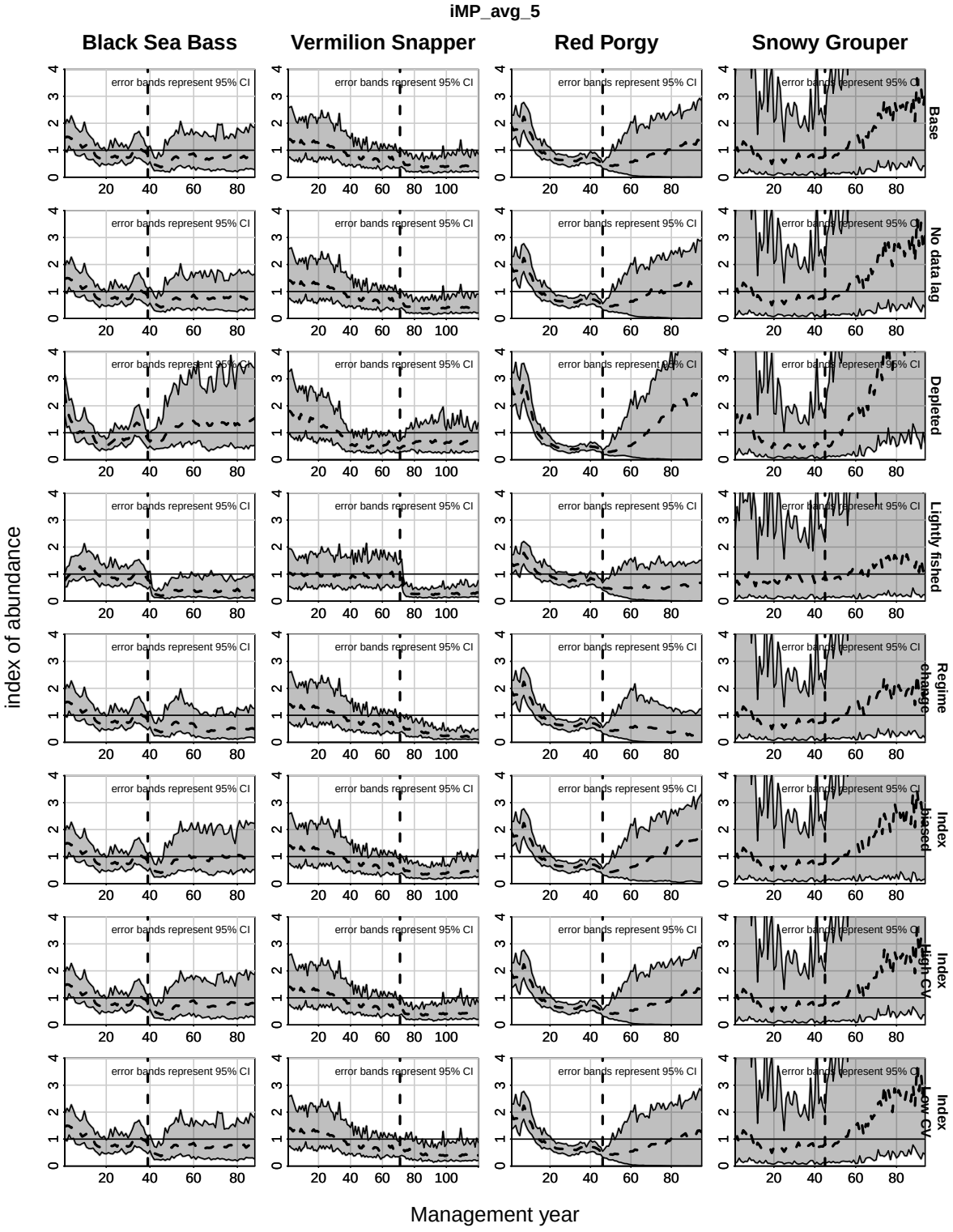

DBSRA
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

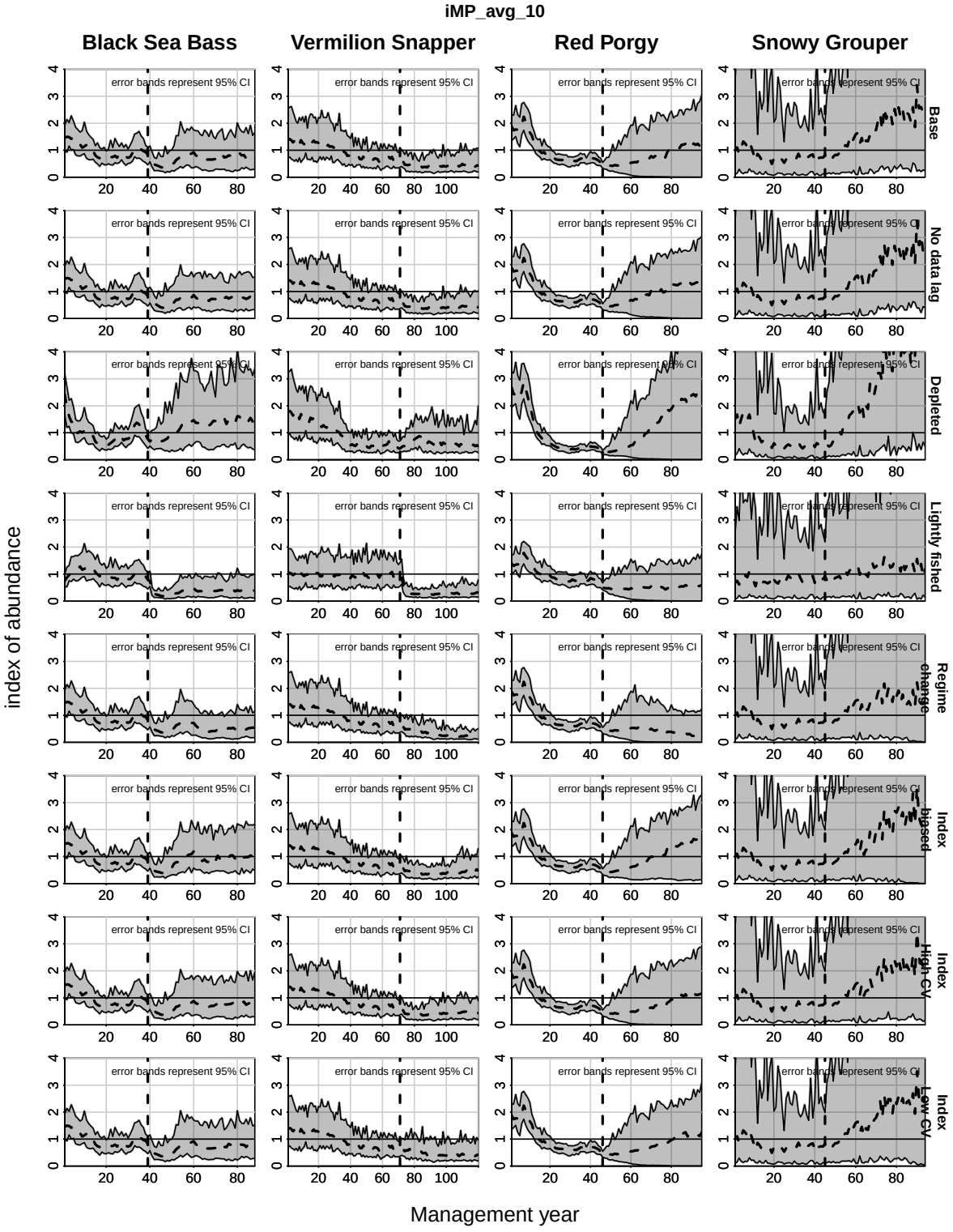

SPMSY
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

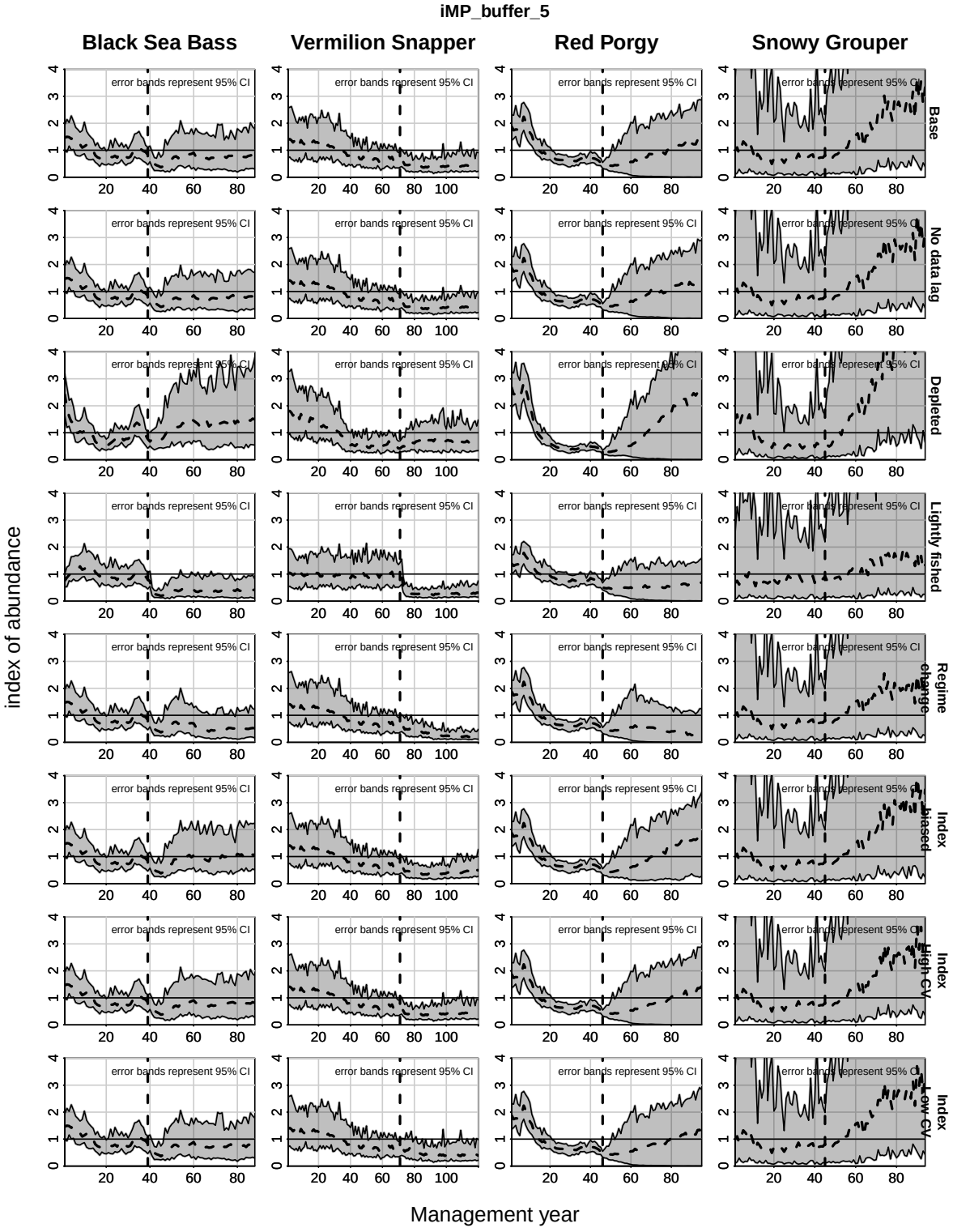

SCA_1
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

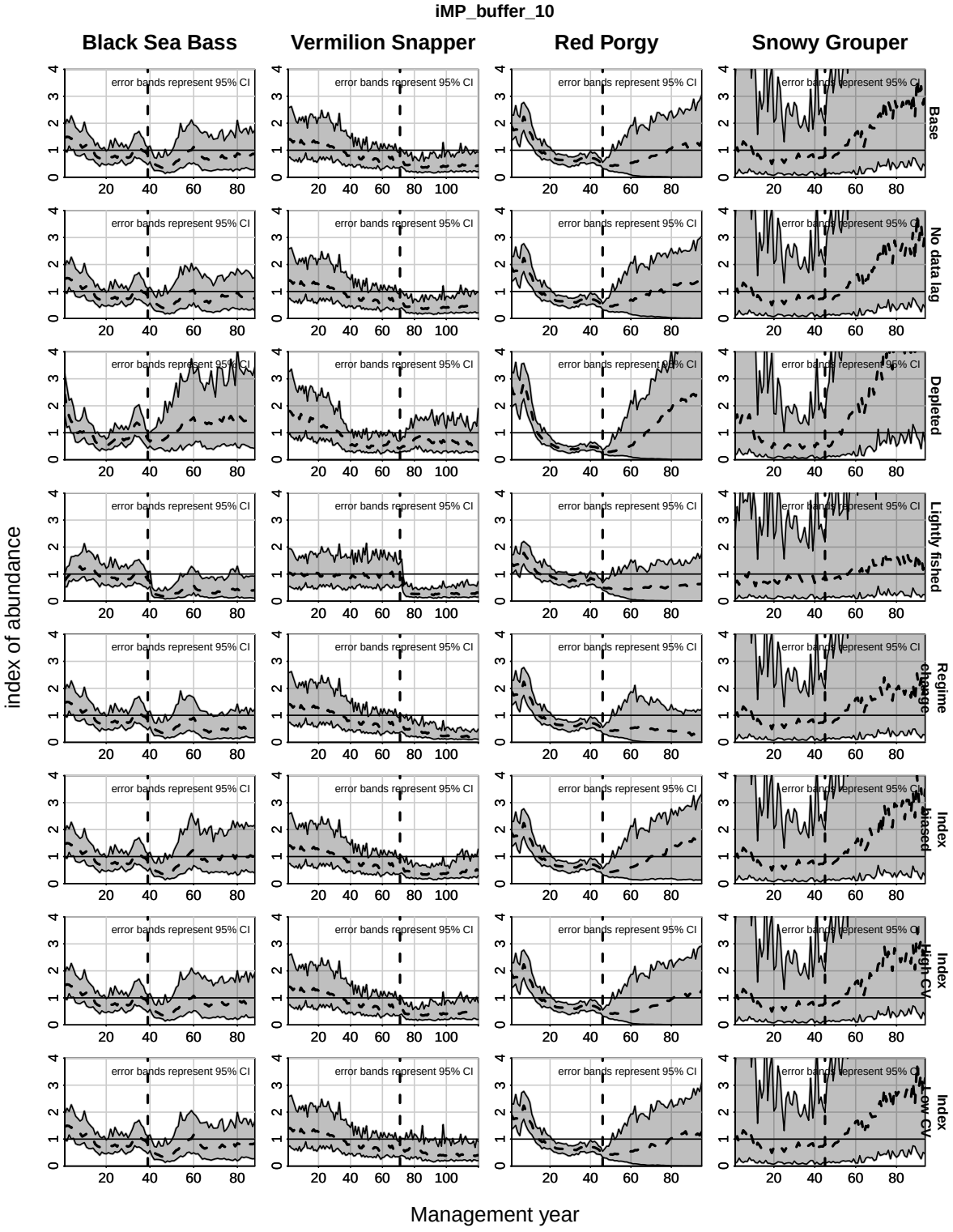

SCA_5
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

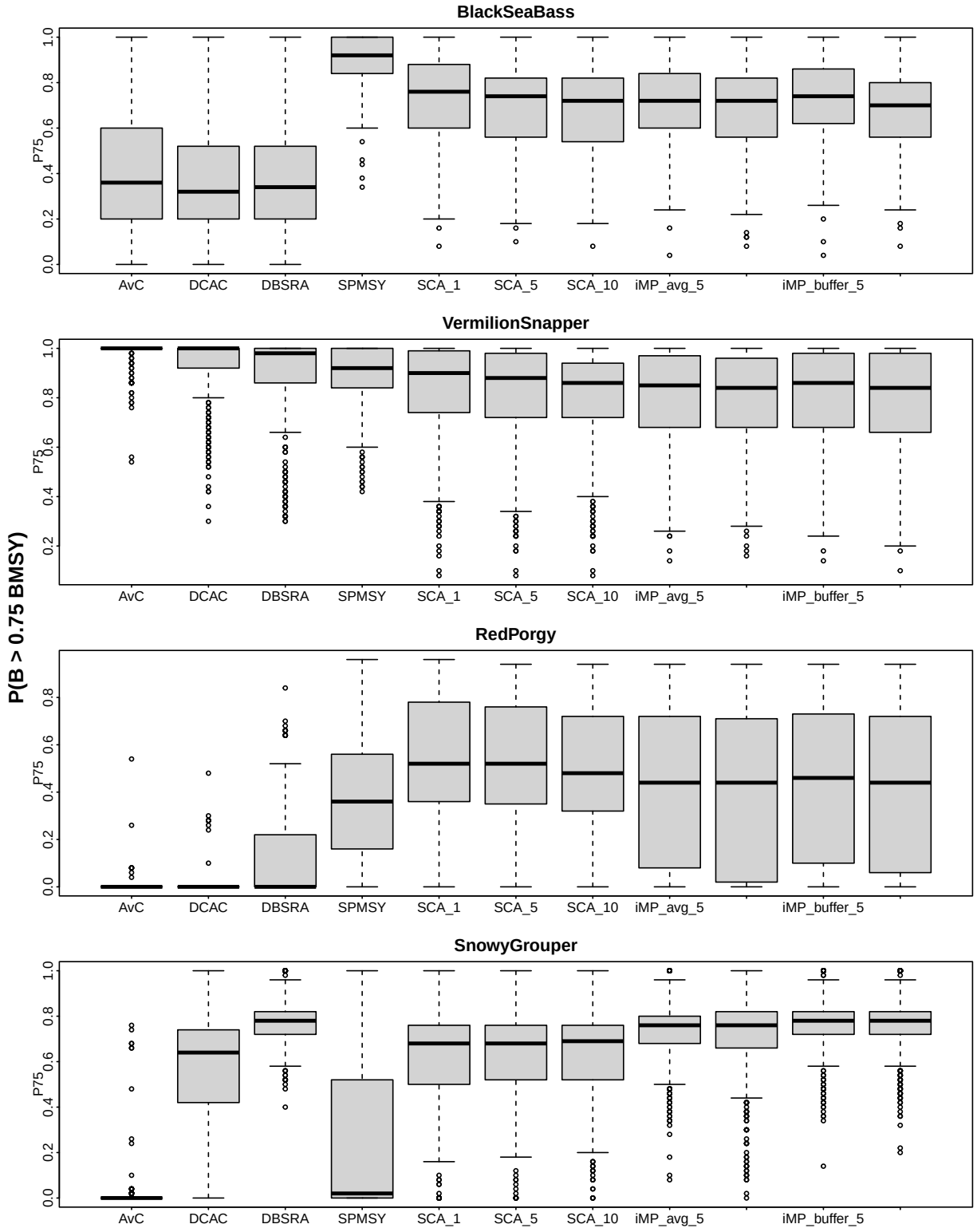

SCA_10
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

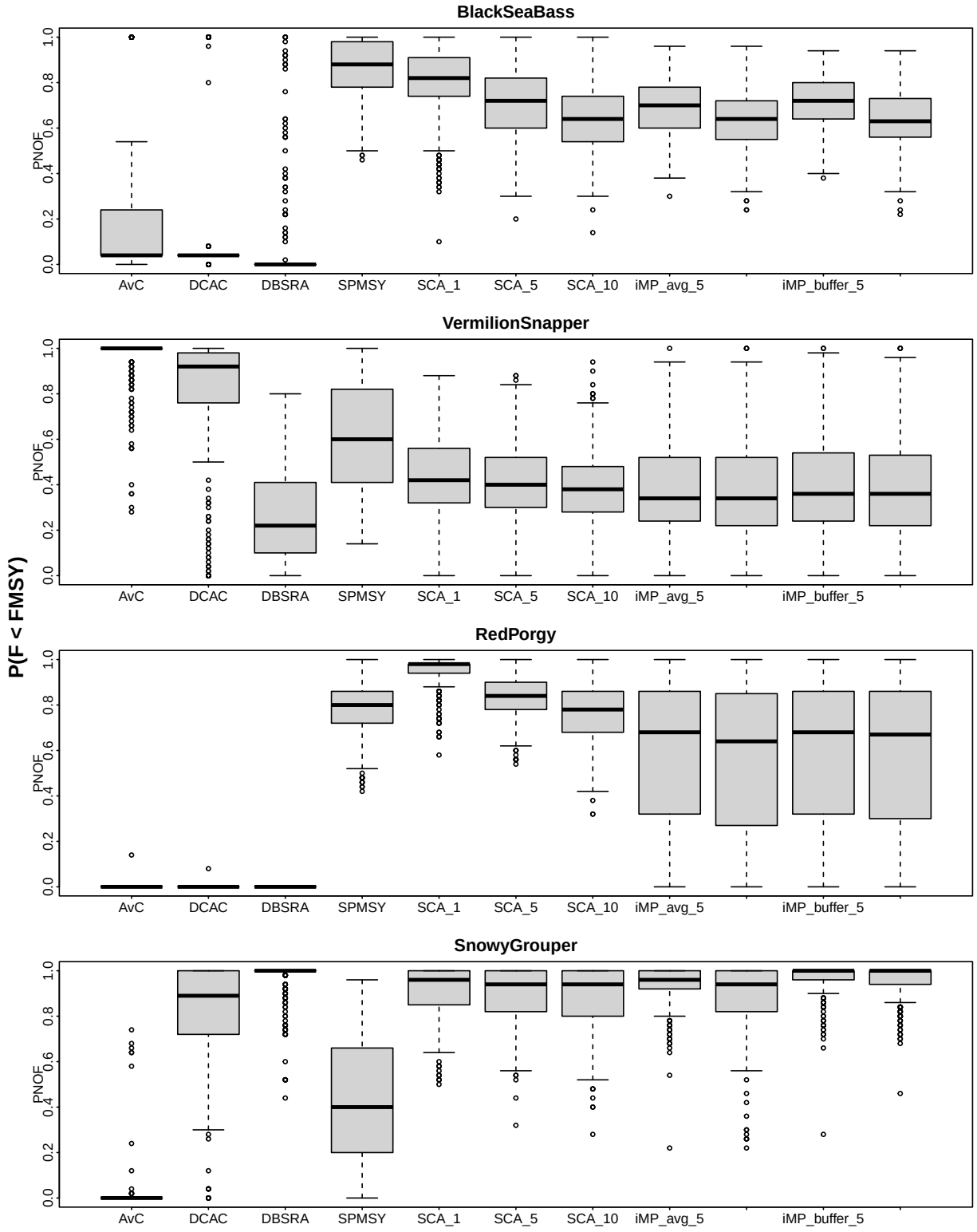

iMP_avg_5
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

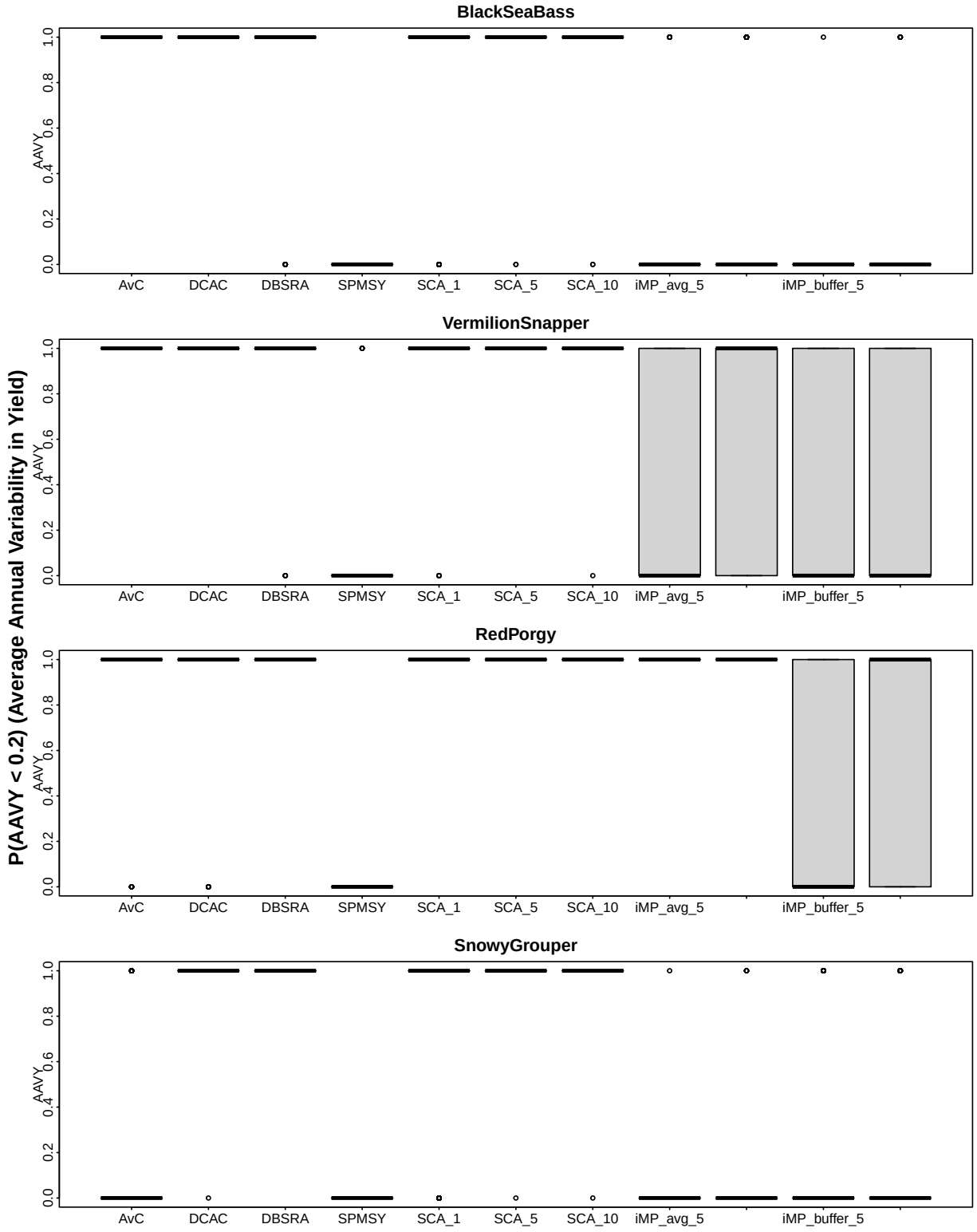

iMP_avg_10
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

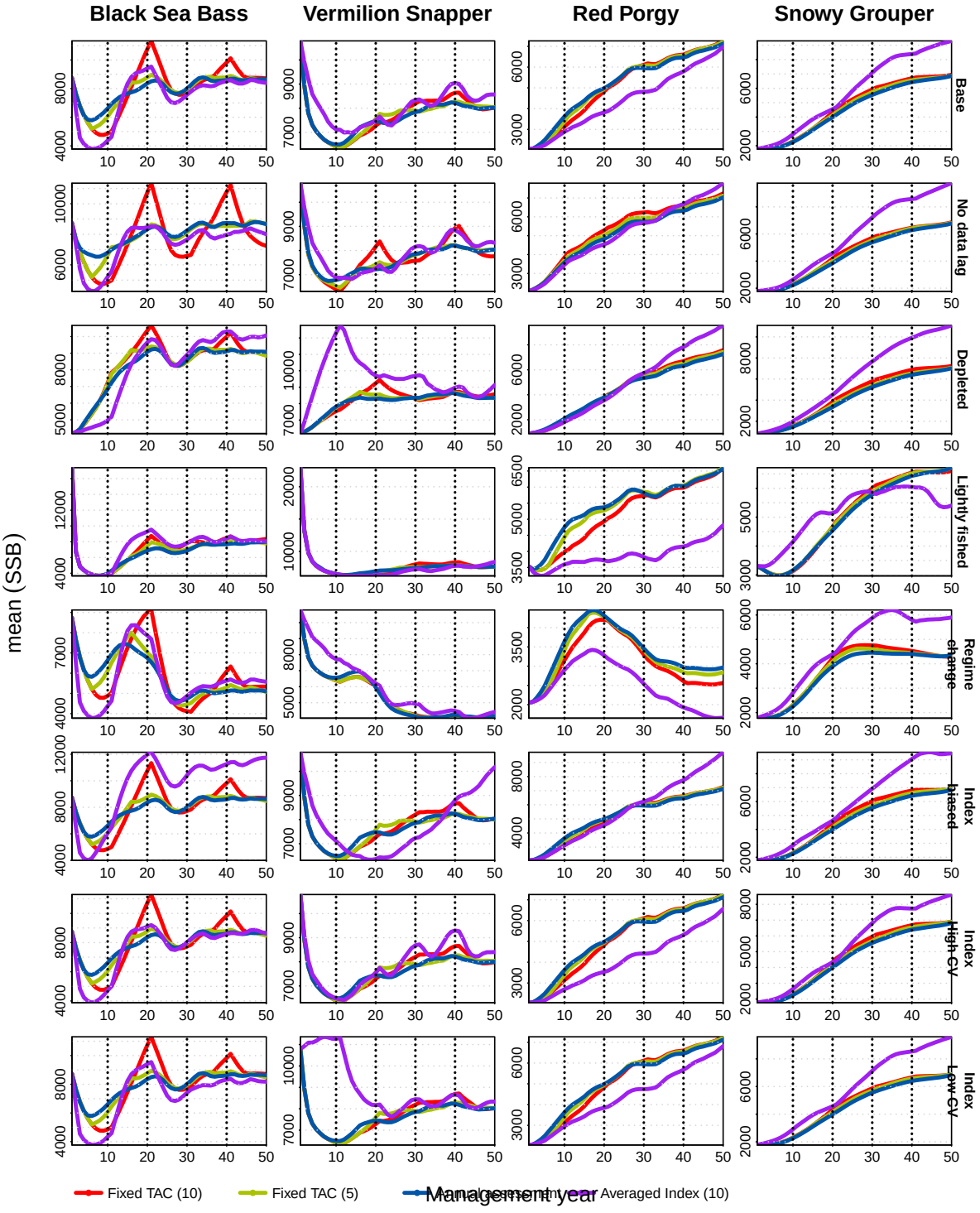

iMP_buffer_5
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

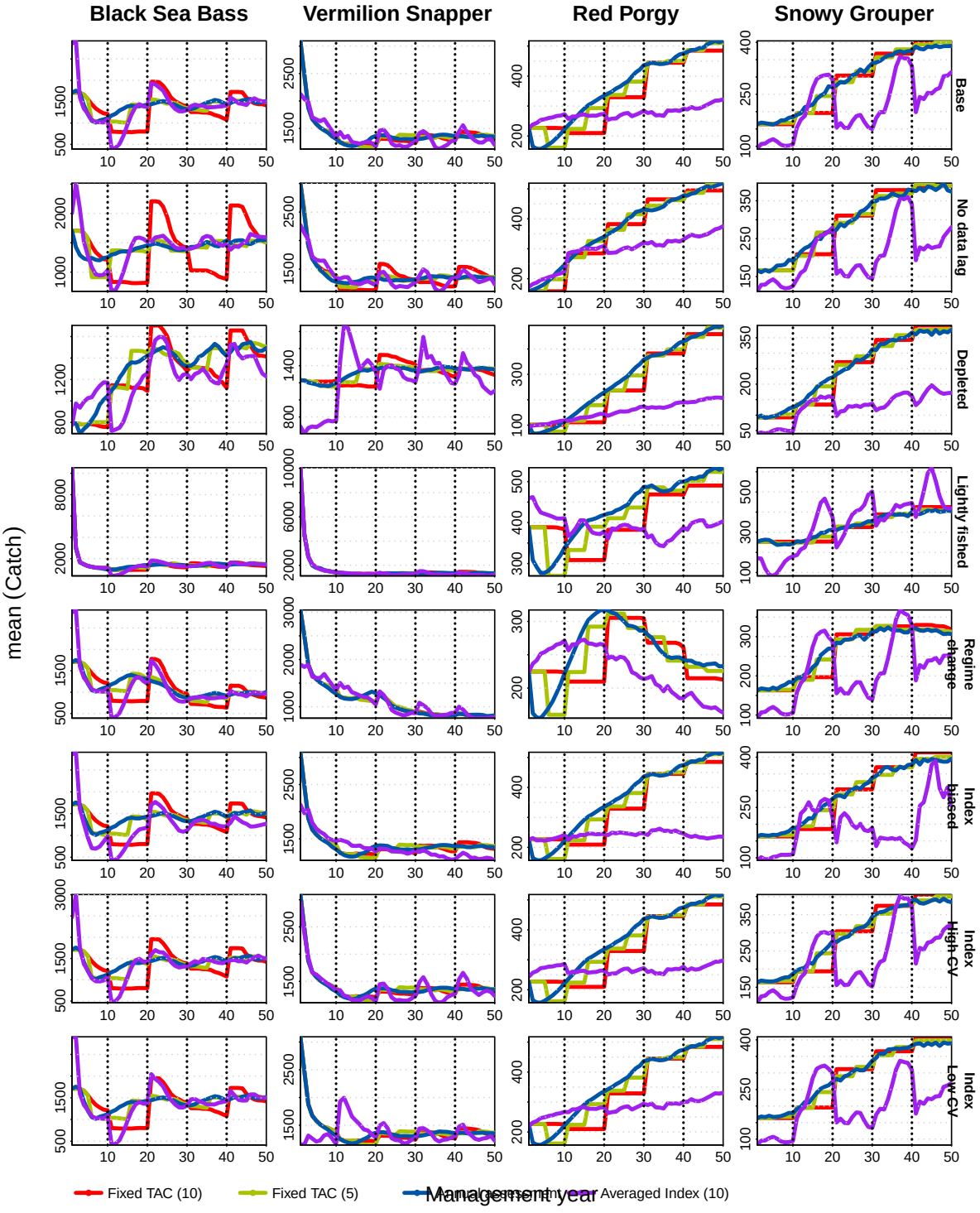

iMP_buffer_10
Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
error bands represent 95% CI
index of abundance
Management year

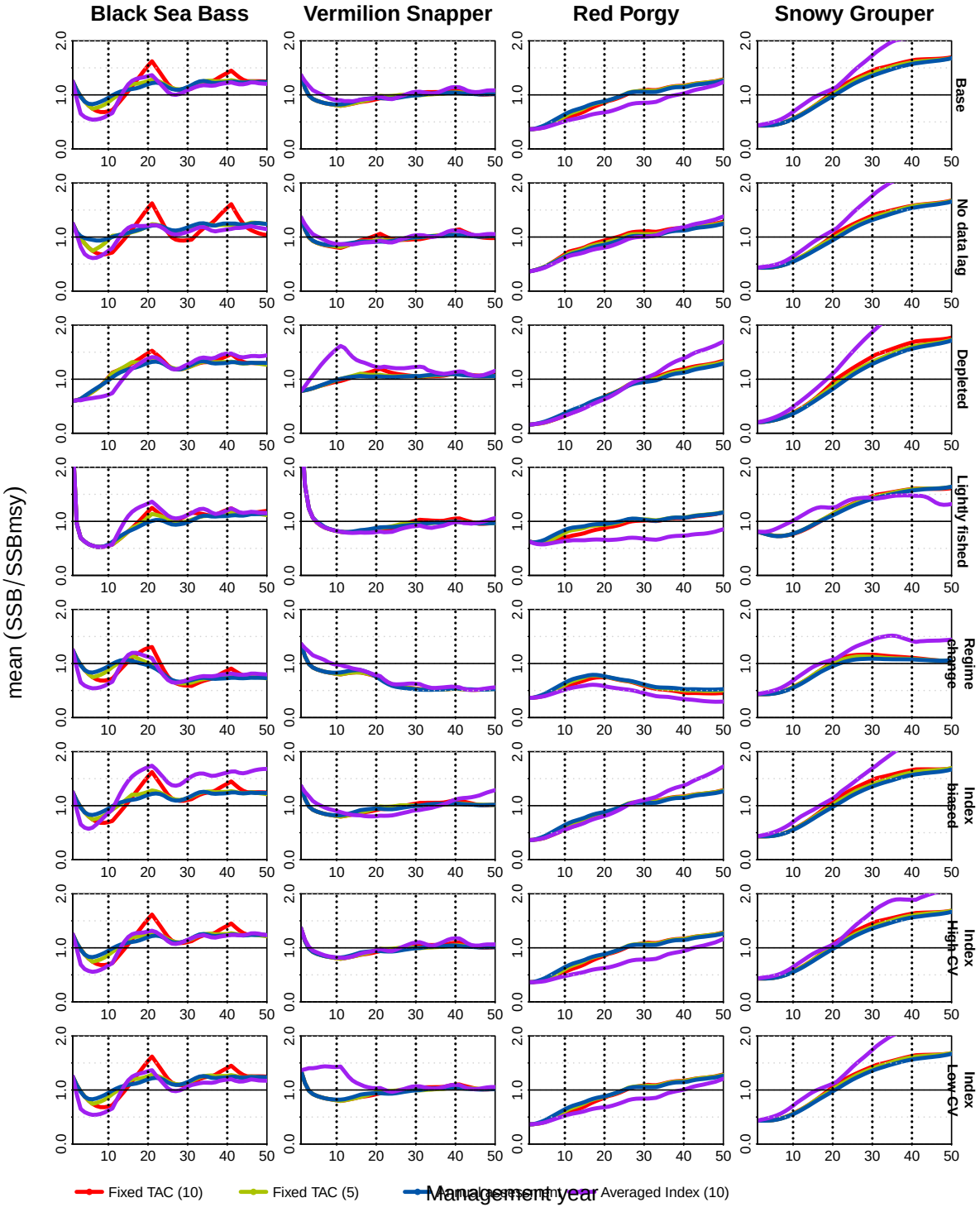

BlackSeaBass
VermilionSnapper
RedPorgy
SnowyGrouper
P(B > 0.75 BMSY)
P75
0.0
0.2
0.4
0.6
0.8
1.0
AvC
DCAC
DBSRA
SPMSY
SCA_1
SCA_5
SCA_10
iMP_avg_5
iMP_buffer_5

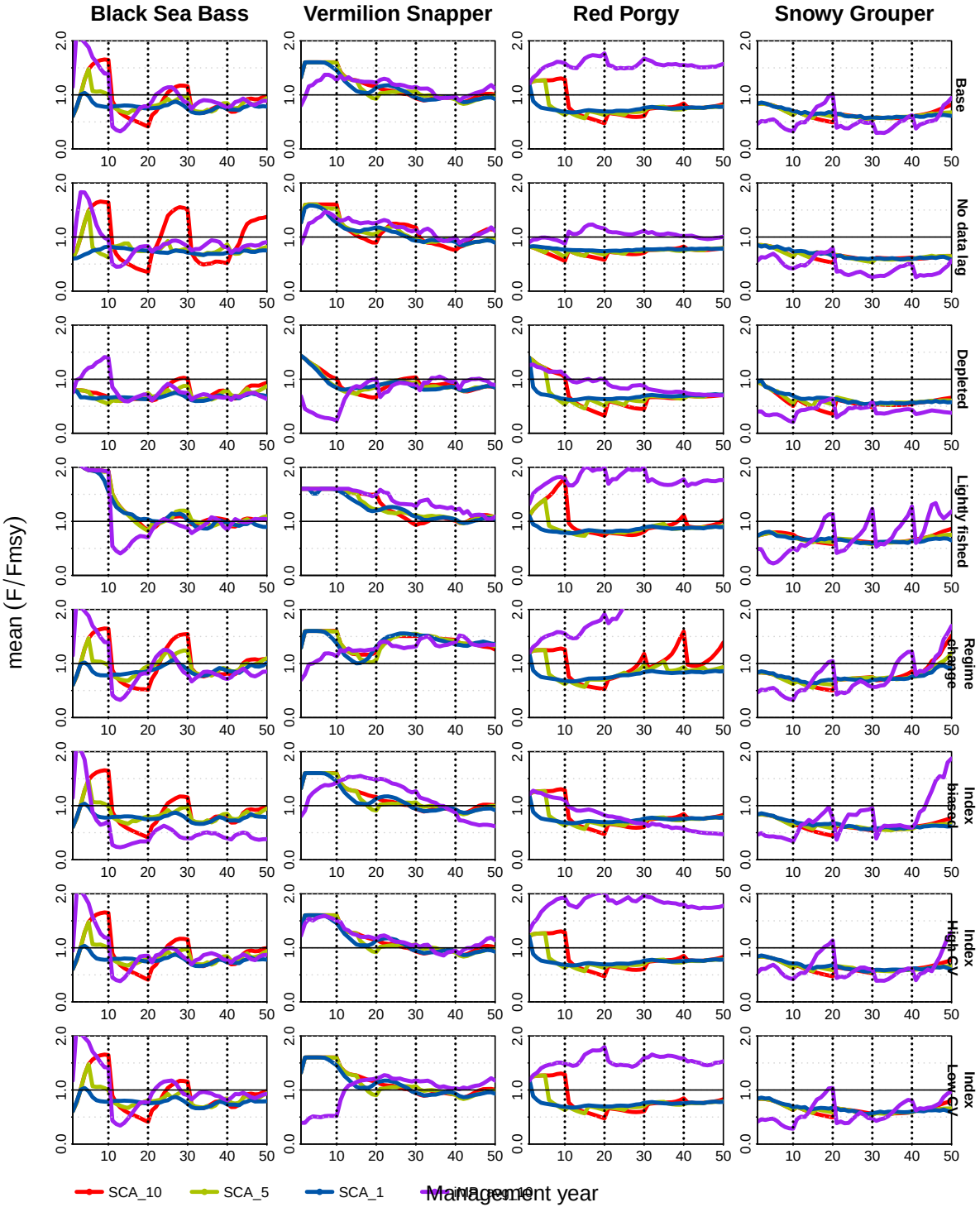

BlackSeaBass
VermilionSnapper
RedPorgy
SnowyGrouper
P(F < FMSY)
PNOF
0.0
0.2
0.4
0.6
0.8
1.0
AvC
DCAC
DBSRA
SPMSY
SCA_1
SCA_5
SCA_10
iMP_avg_5
iMP_buffer_5

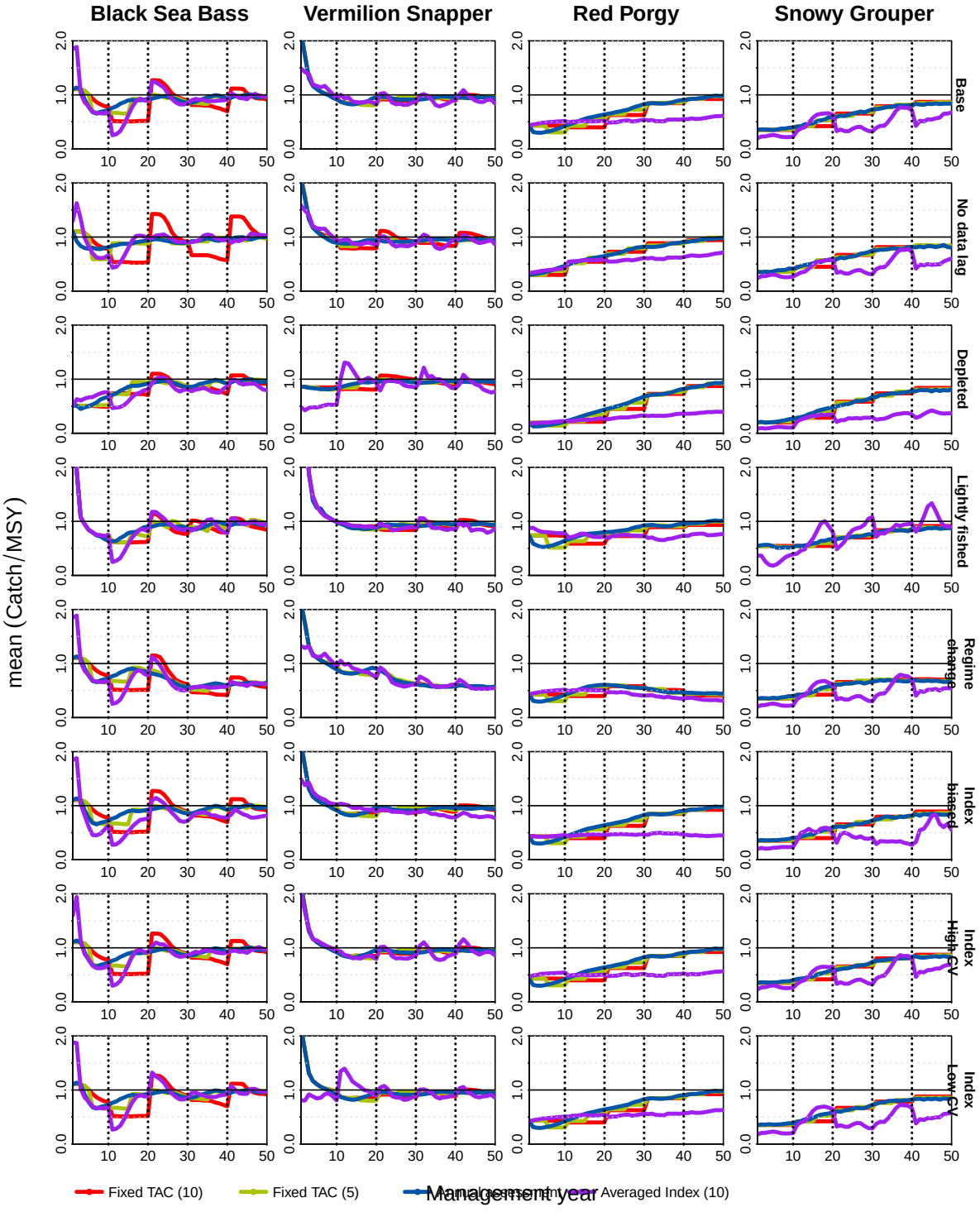

BlackSeaBass
VermilionSnapper
RedPorgy
SnowyGrouper
P(AAVY < 0.2) (Average Annual Variability in Yield)
AAVY
0.0
0.2
0.4
0.6
0.8
1.0
AvC
DCAC
DBSRA
SPMSY
SCA_1
SCA_5
SCA_10
iMP_avg_5
iMP_buffer_5

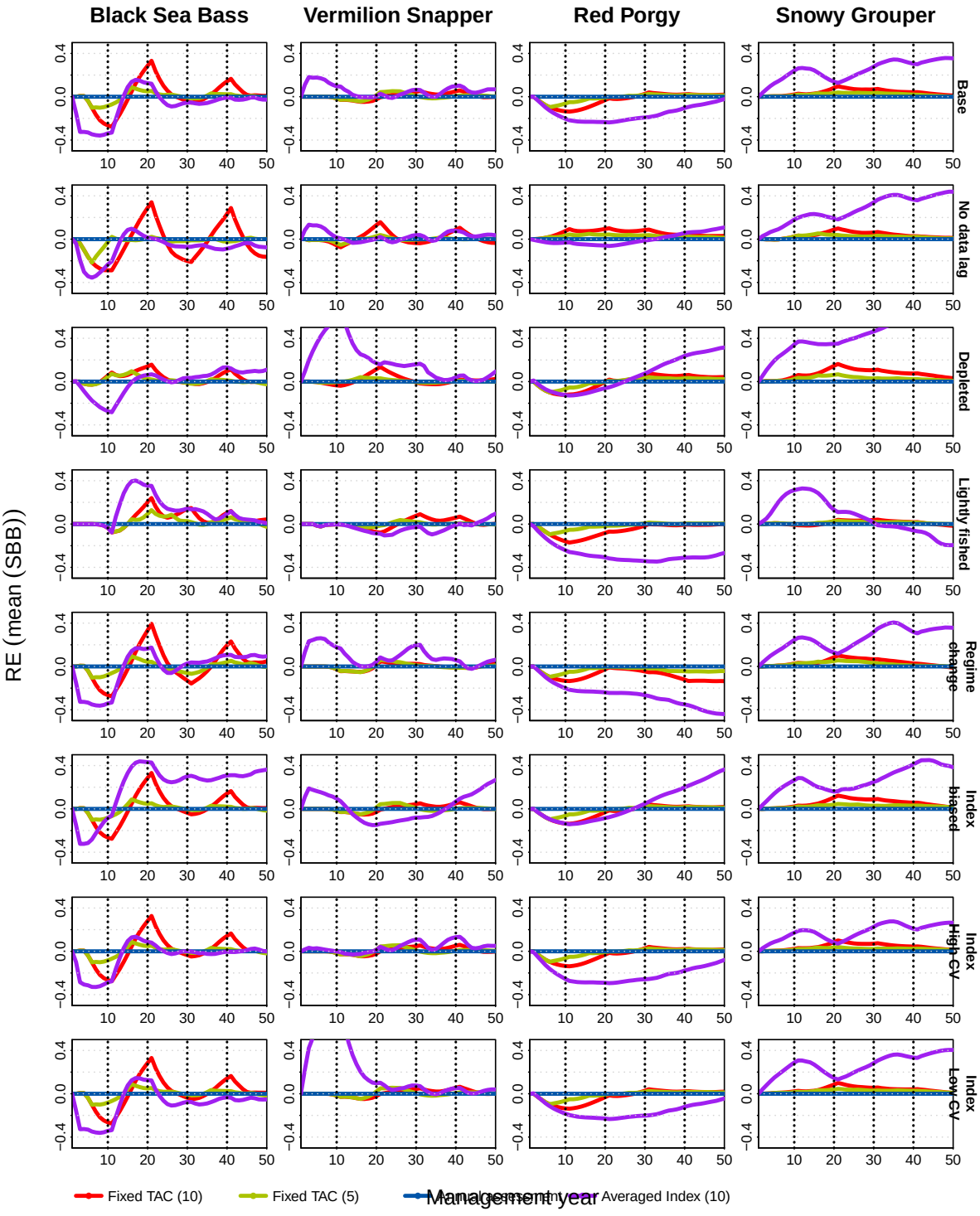

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
mean (SSB)
Management year
Fixed TAC (10)
Fixed TAC (5)
Averaged Index (10)

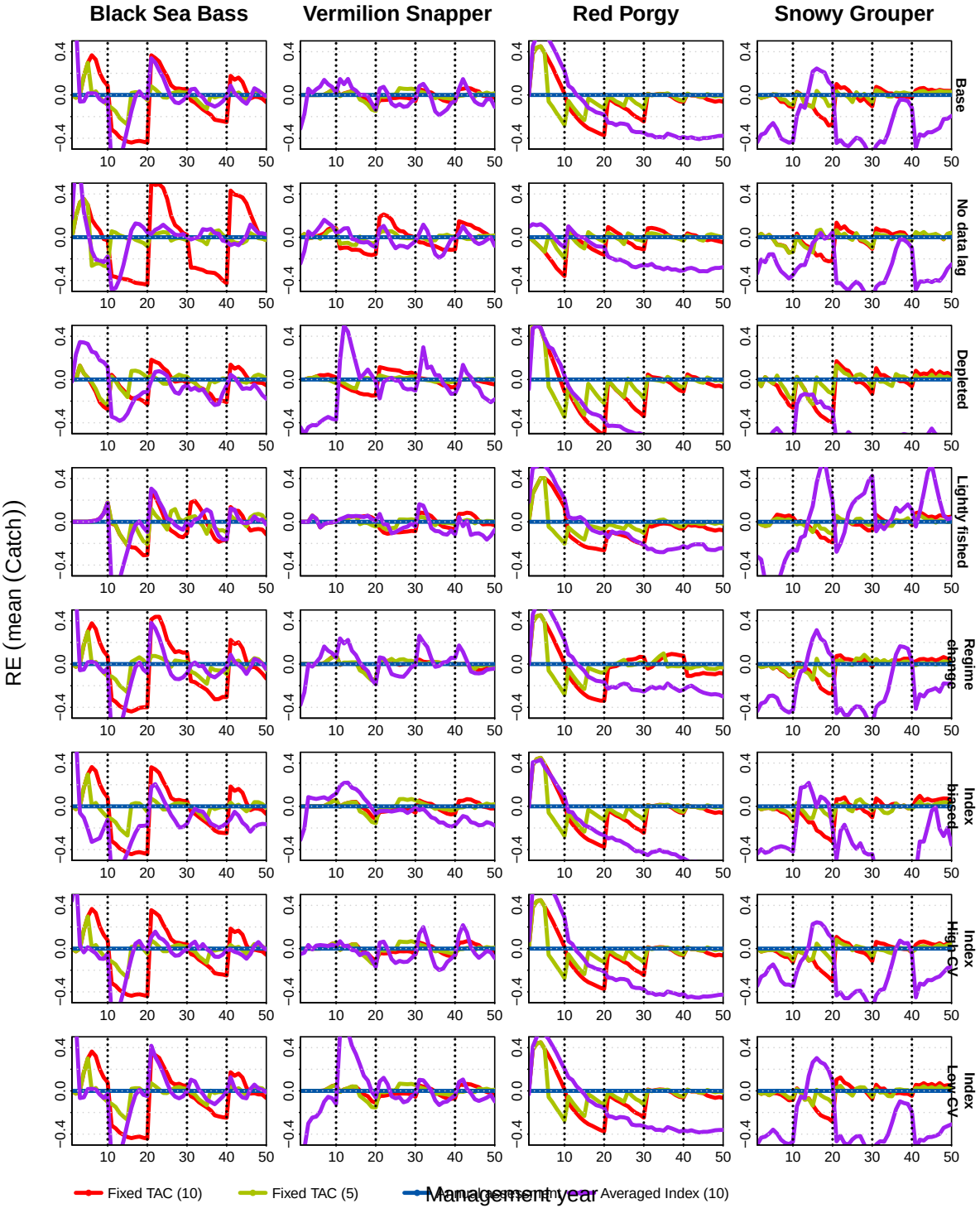

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
mean (Catch)
Management year
Fixed TAC (10)
Fixed TAC (5)
Averaged Index (10)

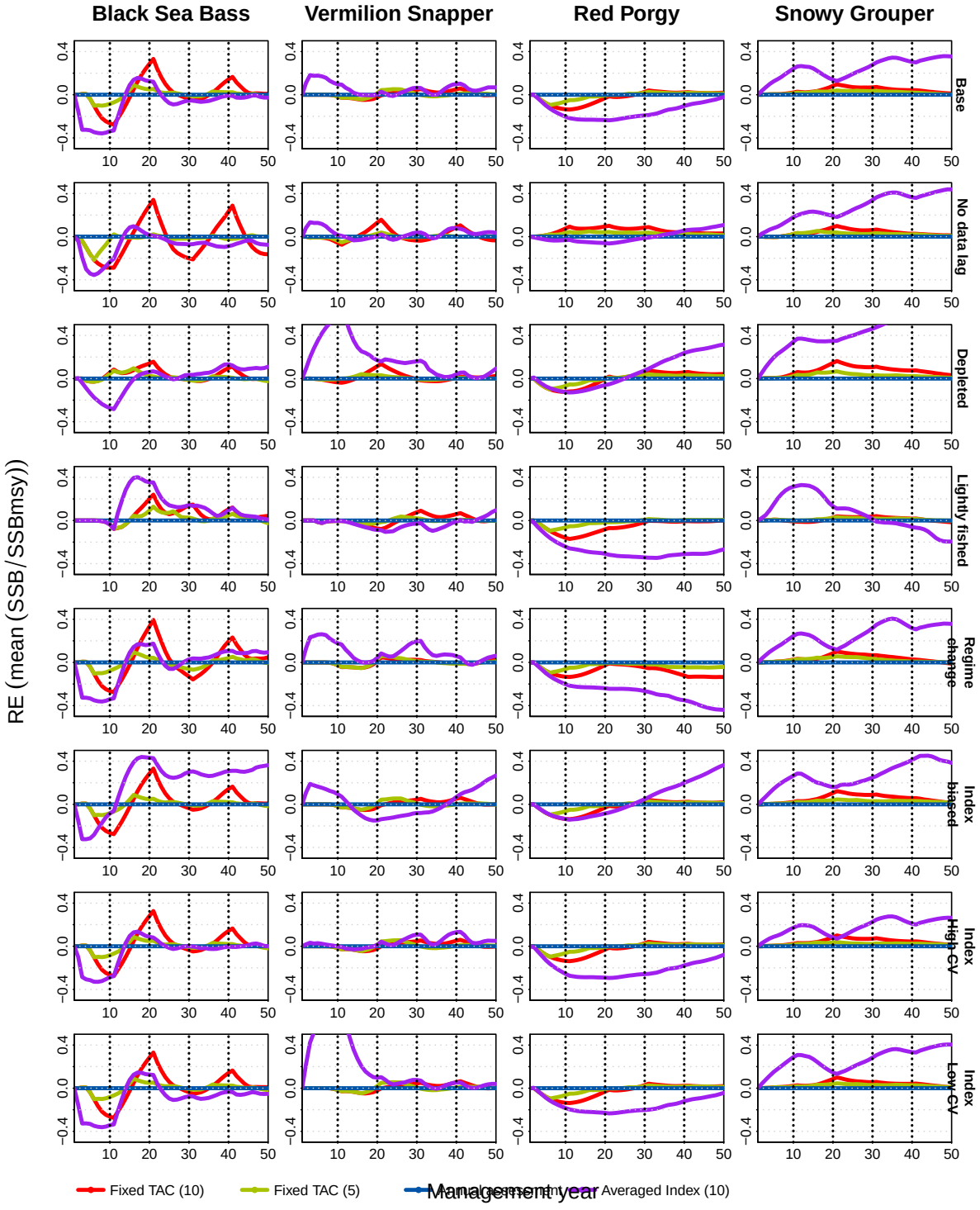

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
mean (SSB/SSBmsy)
Management year
Fixed TAC (10)
Fixed TAC (5)
Averaged Index (10)

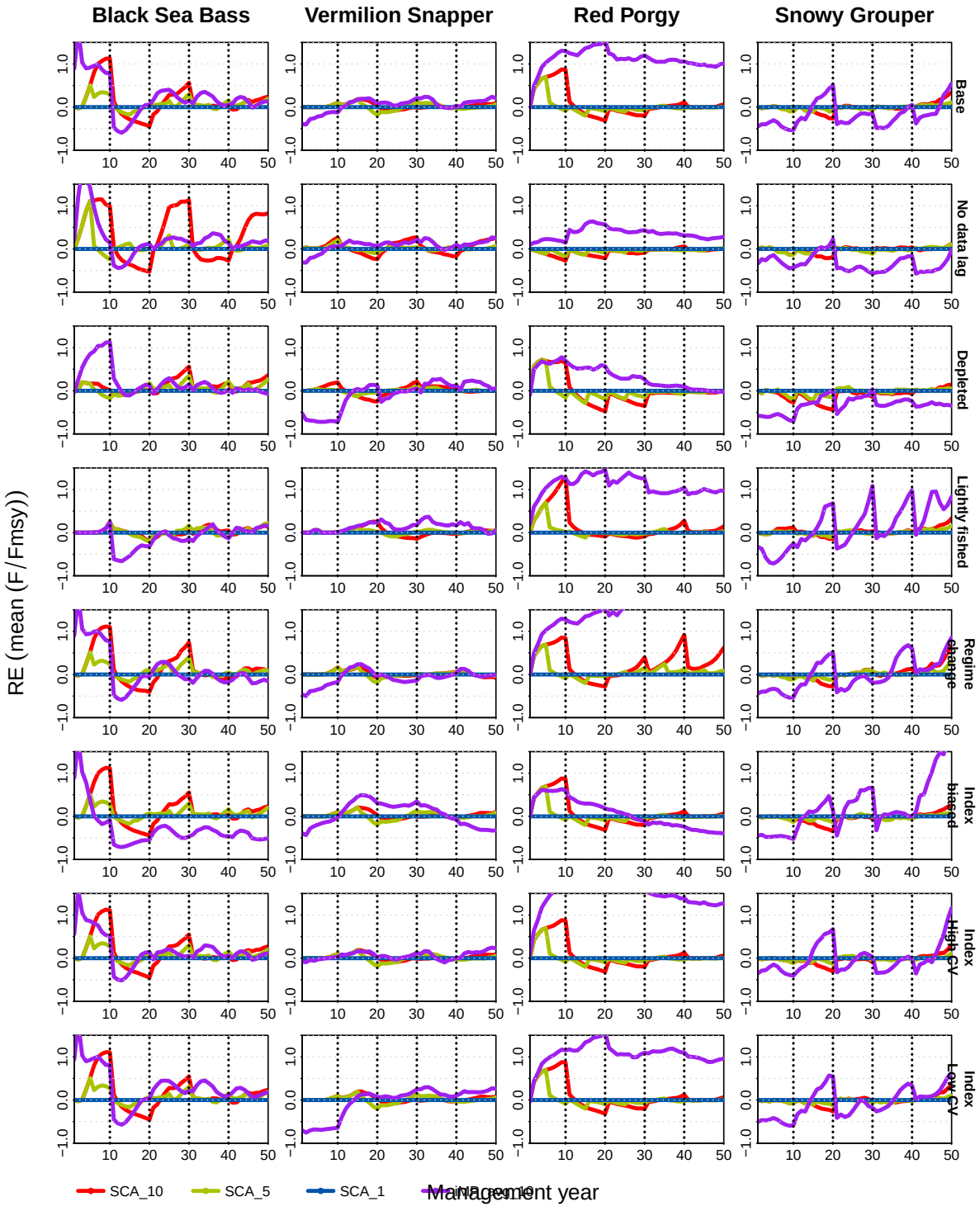

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
mean (F/Fmsy)
Management year
SCA_10
SCA_5
SCA_1
MP_ref10

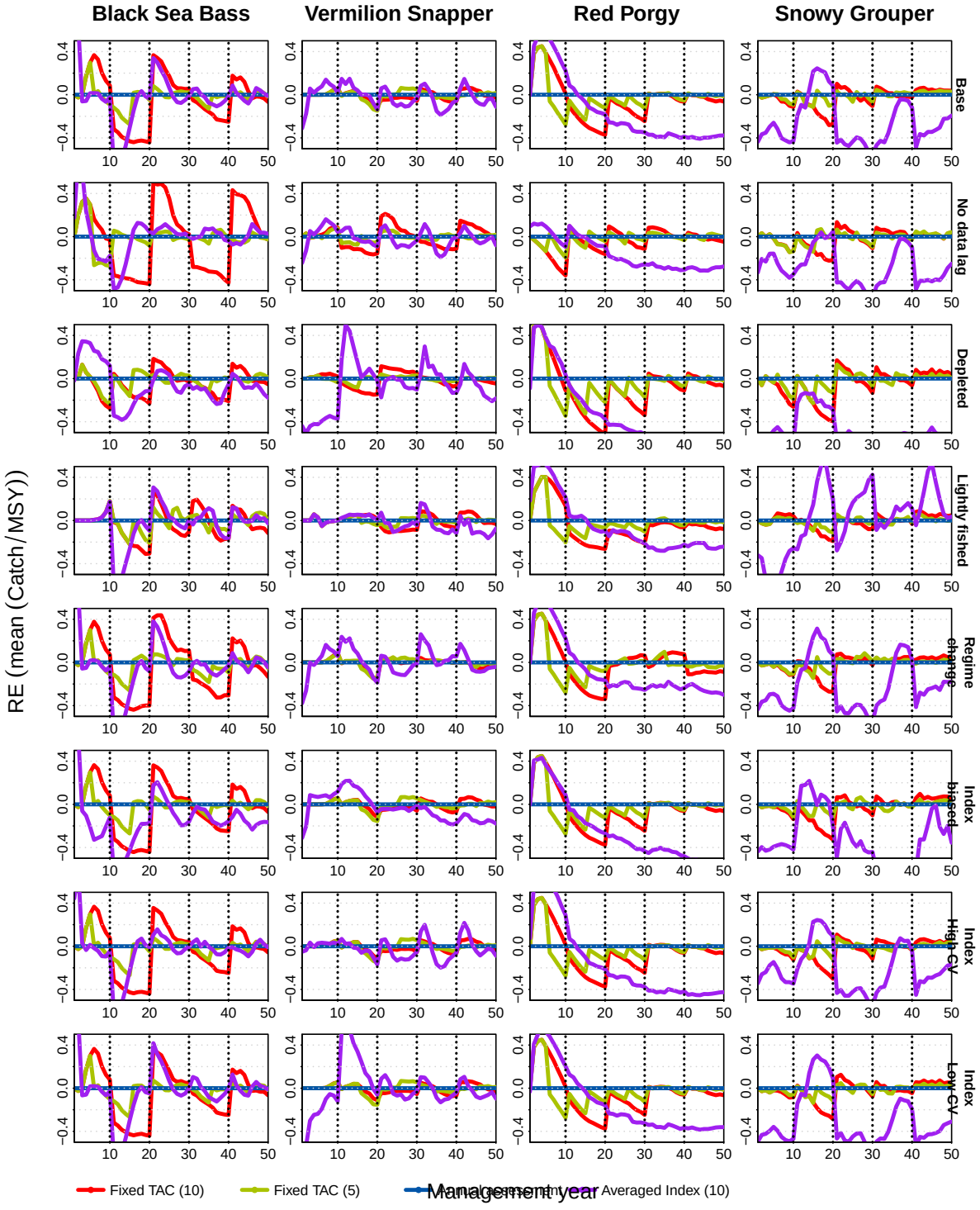

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
mean (Catch/MSY)
Management year
Fixed TAC (10)
Fixed TAC (5)
Averaged Index (10)

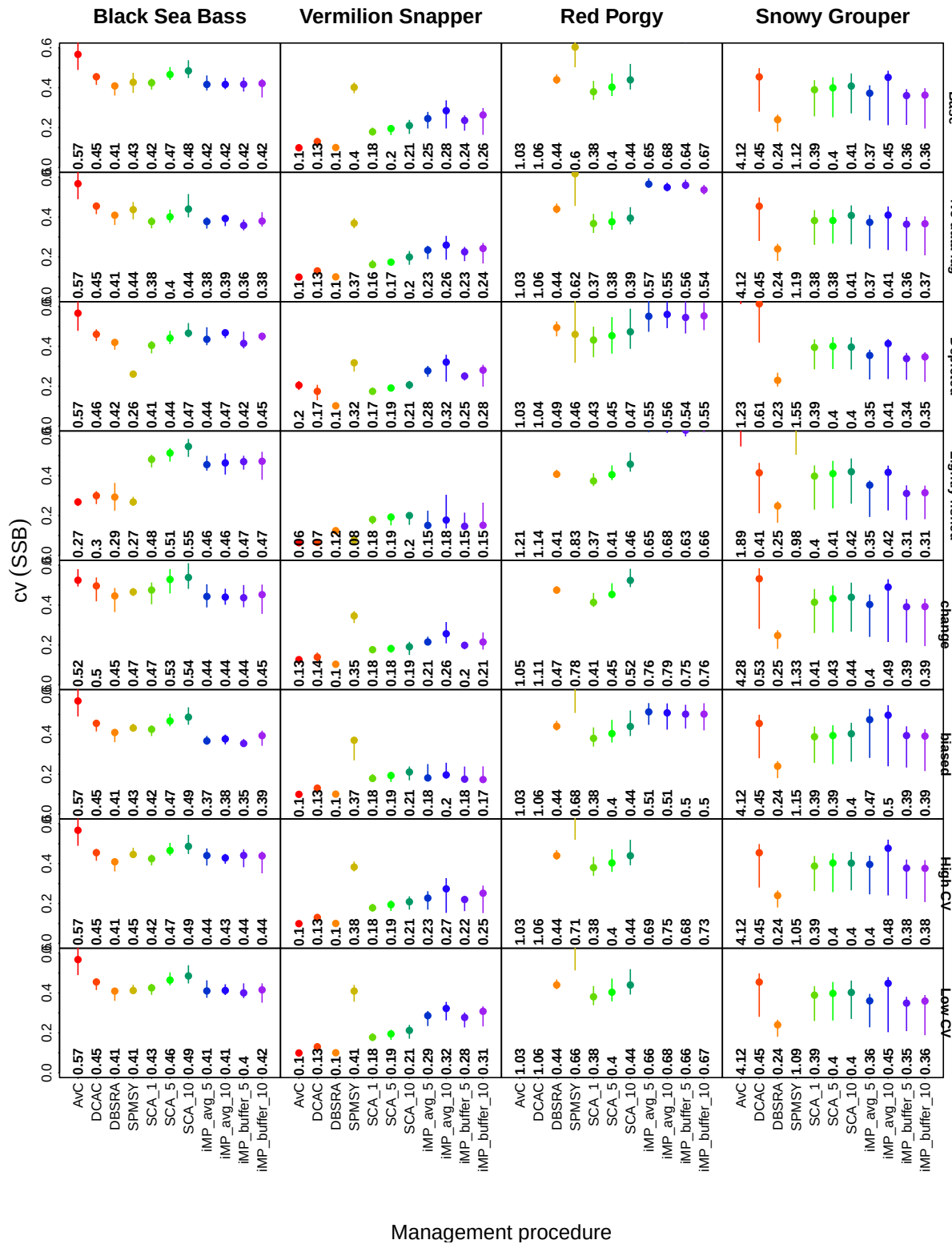

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
RE (mean (SBB))
Management year
Fixed TAC (10)
Fixed TAC (5)
Averaged Index (10)

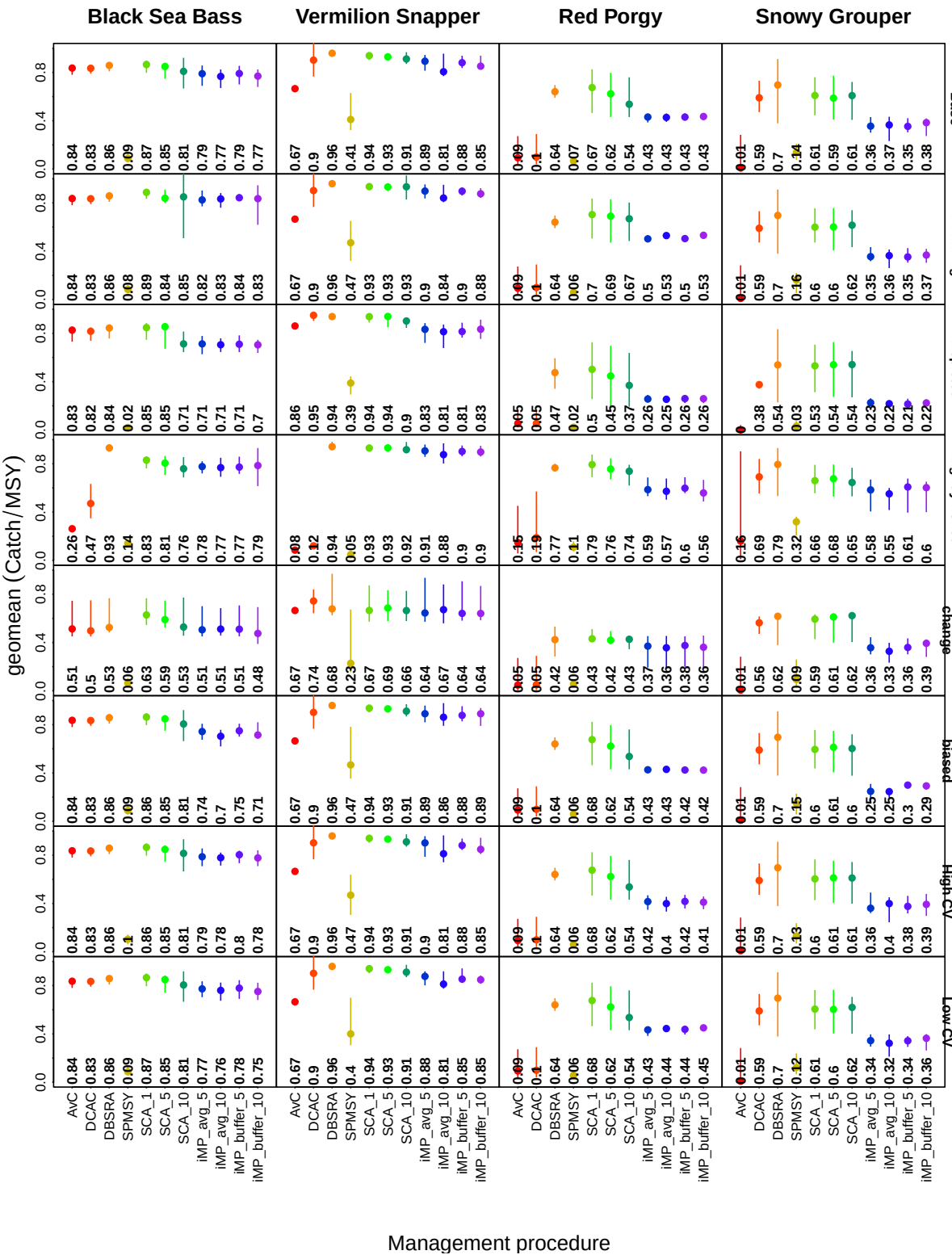

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
RE (mean (Catch))
Management year
Fixed TAC (10)
Fixed TAC (5)
Averaged Index (10)


Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
RE (mean (SSB/SSBmsy))
Management year
Fixed TAC (10)
Fixed TAC (5)
Annual assessment
3 year Averaged Index (10)

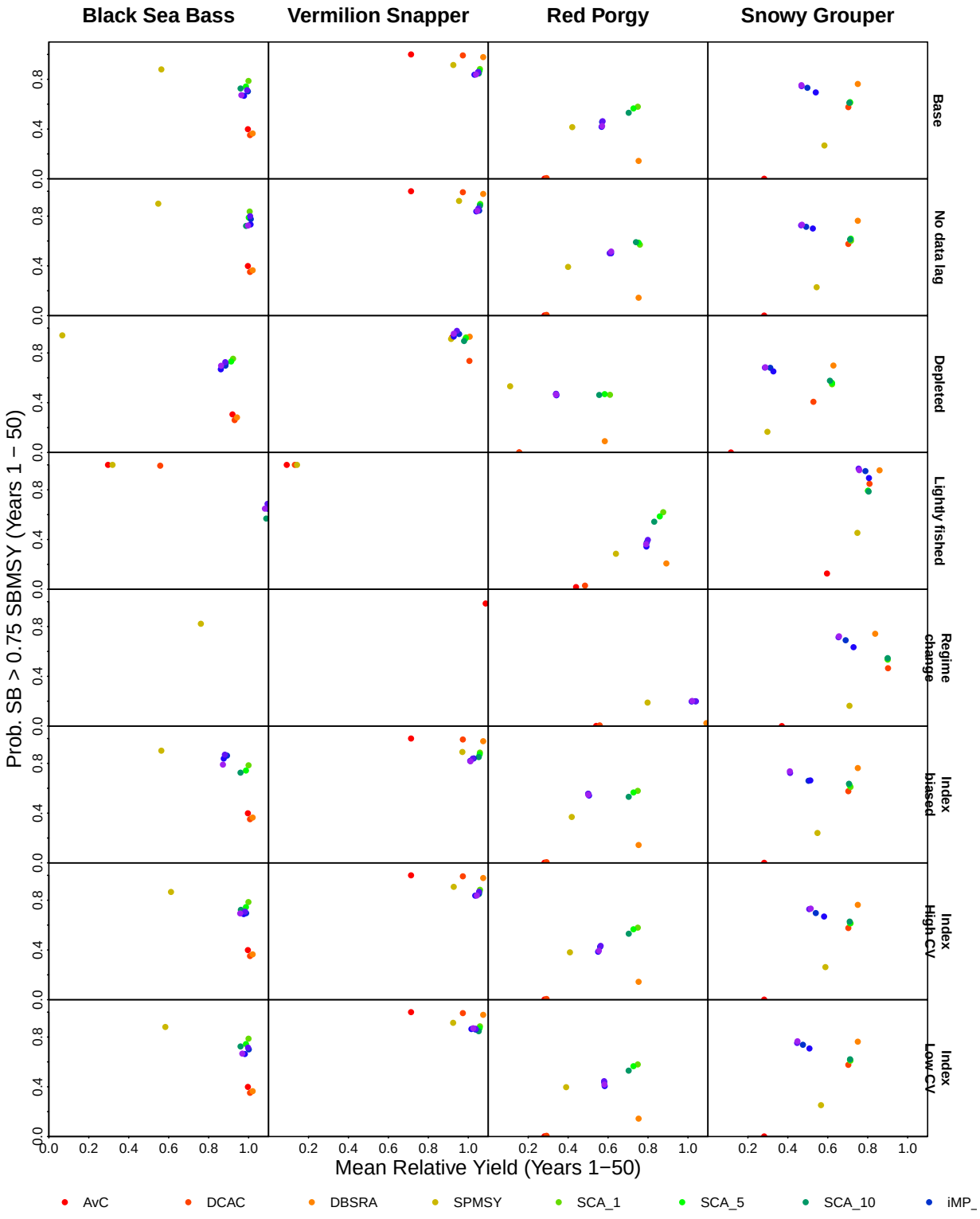

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
RE (mean (F/Fmsy))
Management year
SCA_10
SCA_5
SCA_1

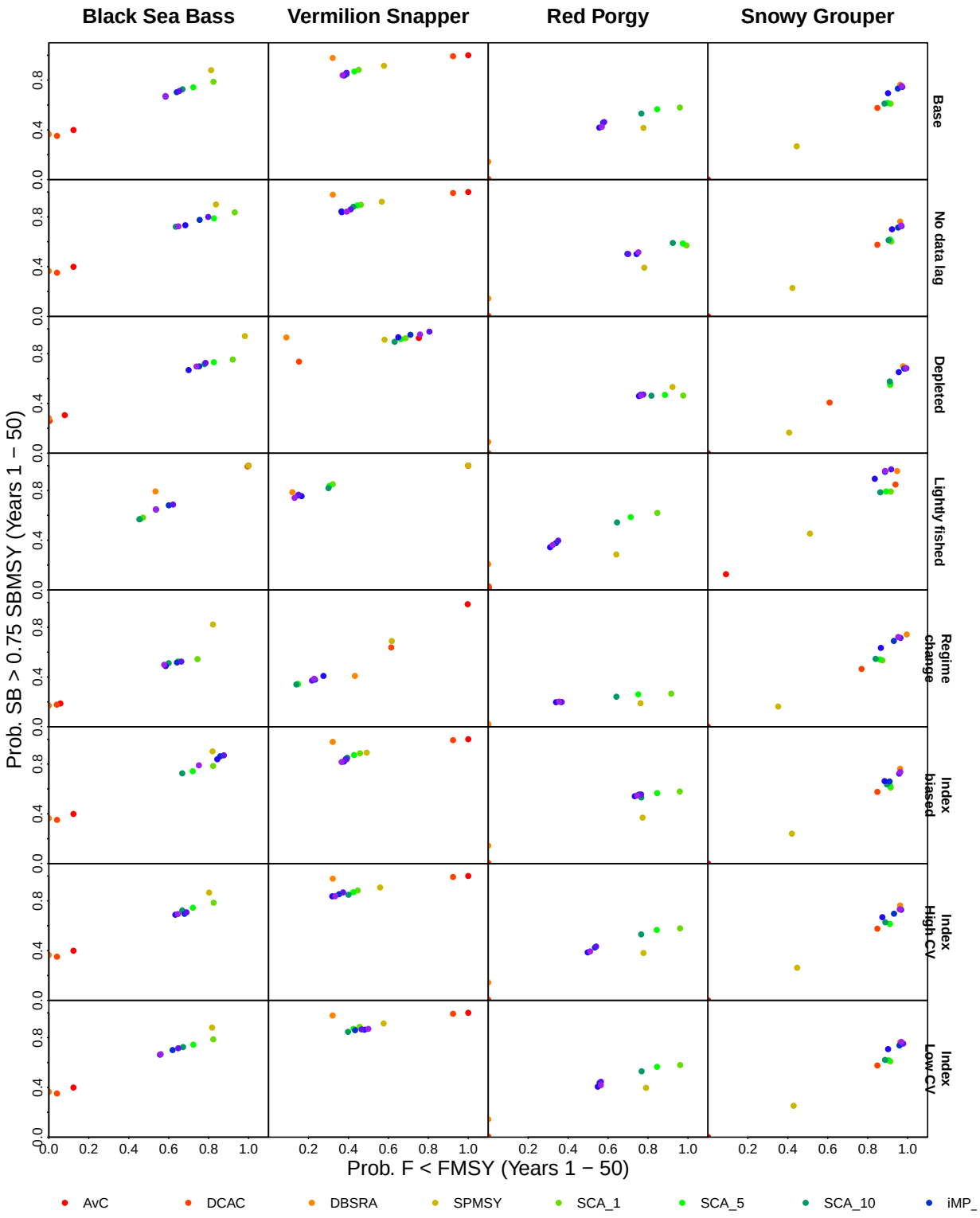

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
RE (mean (Catch/MSY))
Management year
Fixed TAC (10)
Fixed TAC (5)
Averaged Index (10)

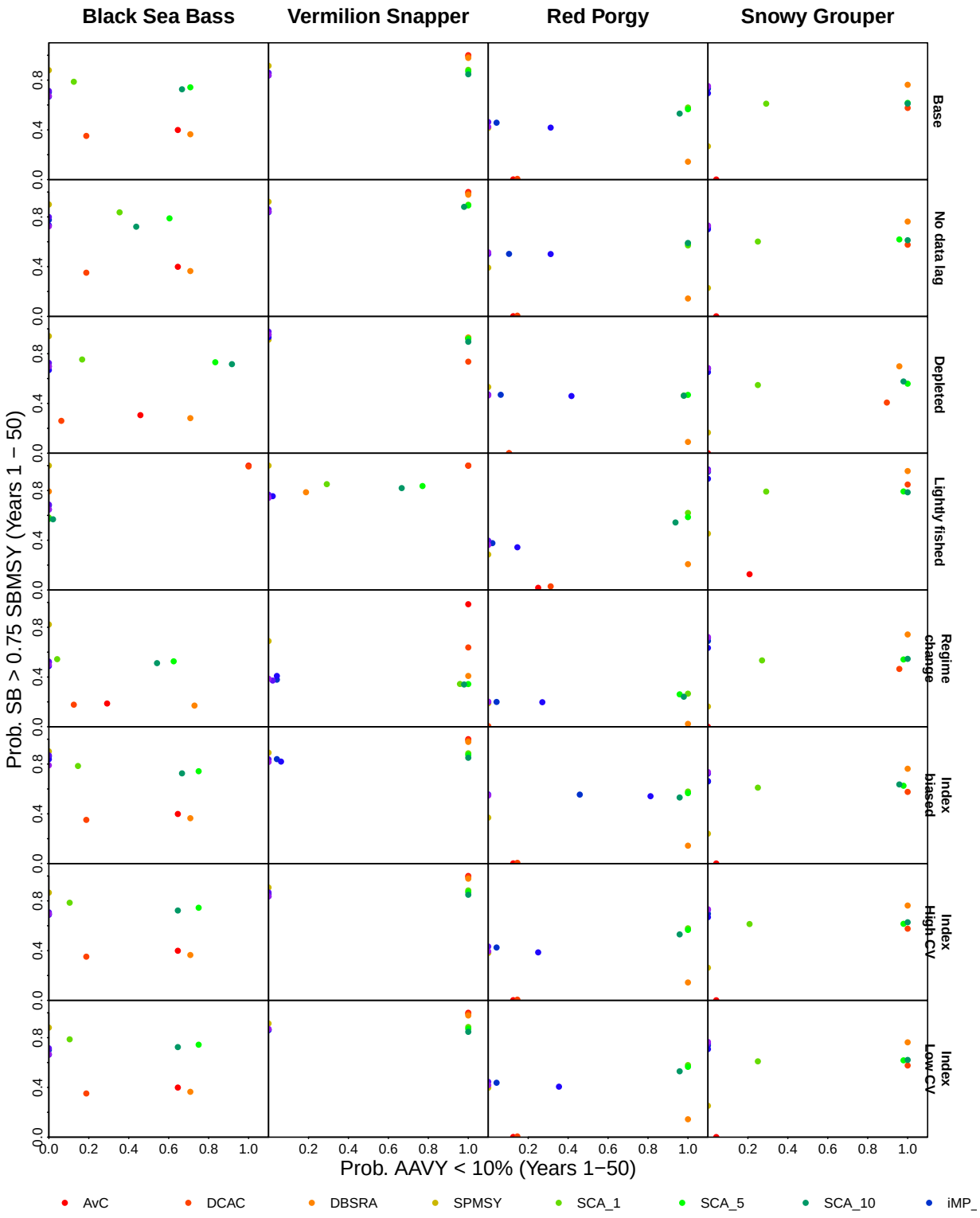

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
cv (SSB)
0.0
0.2
0.4
0.6
AvC
DCAC
DBSRA
SPMSY
SCA_1
SCA_5
SCA_10
iMP_avg_5
iMP_avg_10
iMP_buffer_5
iMP_buffer_10
Management procedure

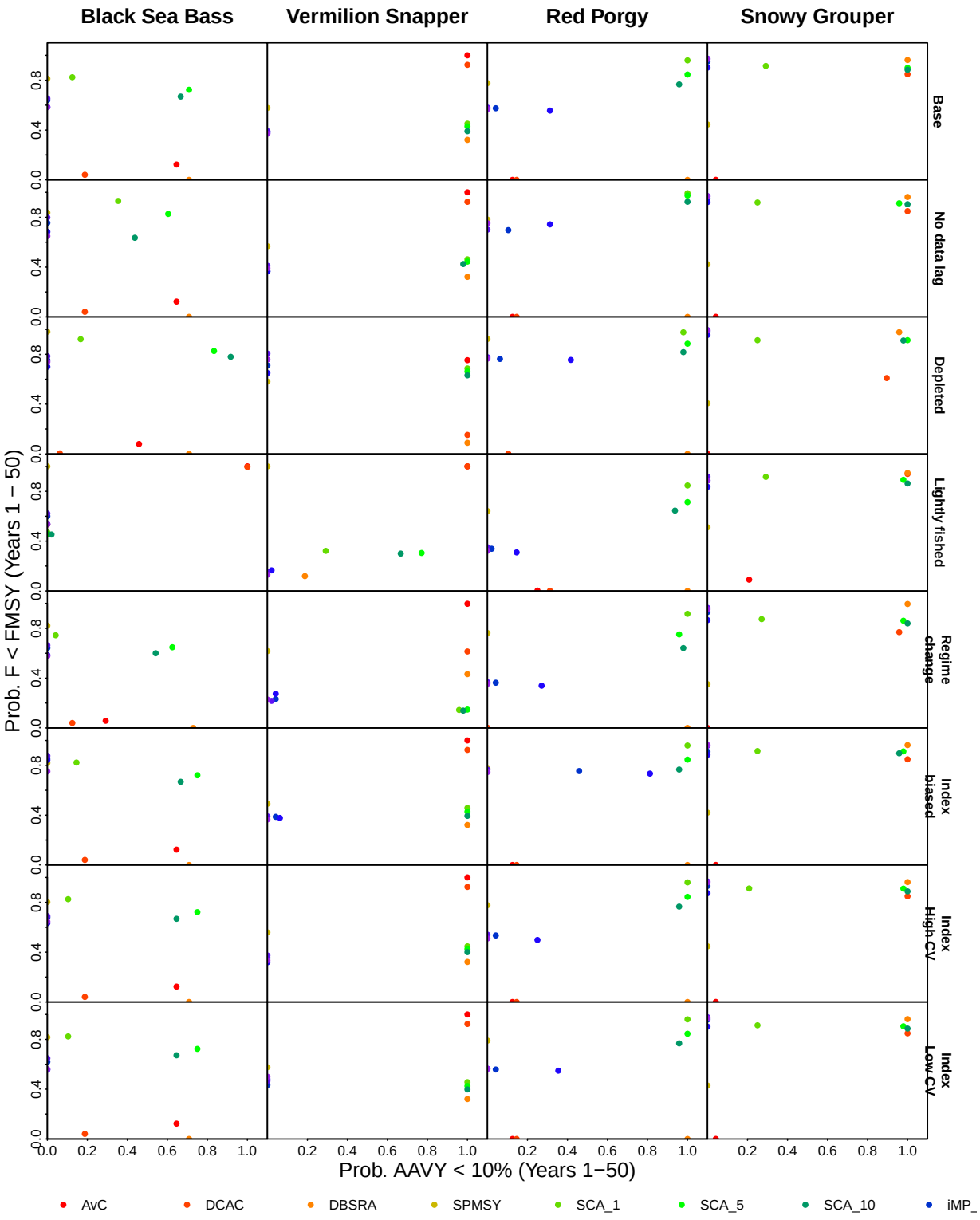

Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
geomean (Catch/MSY)
Management procedure
AvC
DCAC
DBSRA
SPMSY
SCA_1
SCA_5
SCA_10
iMP_avg_5
iMP_avg_10
iMP_buffer_5
iMP_buffer_10

Tradeoff plots

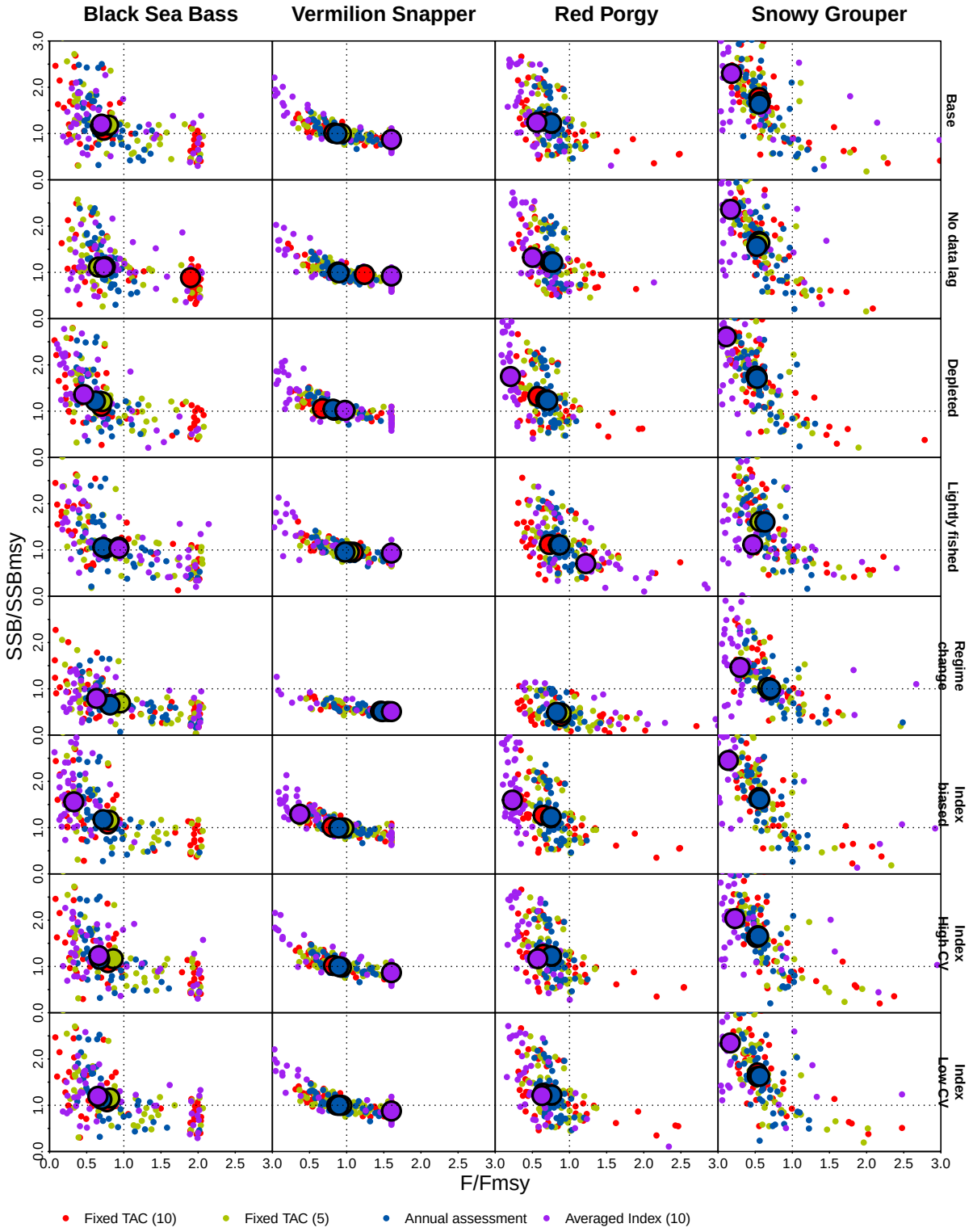



Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
Prob. SB > 0.75 SBMSY (Years 1 – 50)
Prob. F < FMSY (Years 1 – 50)
0.0
0.2
0.4
0.6
0.8
1.0
AvC
DCAC
DBSRA
SPMSY
SCA_1
SCA_5
SCA_10
iMP_


Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
Prob. SB > 0.75 SBMSY (Years 1 – 50)
Prob. AAVY < 10% (Years 1−50)
0.0
0.2
0.4
0.6
0.8
1.0
AvC
DCAC
DBSRA
SPMSY
SCA_1
SCA_5
SCA_10
iMP_


Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
Prob. F < FMSY (Years 1 – 50)
Prob. AAVY < 10% (Years 1−50)
0.0
0.2
0.4
0.6
0.8
1.0
AvC
DCAC
DBSRA
SPMSY
SCA_1
SCA_5
SCA_10
iMP_

Phase plots


Black Sea Bass
Vermilion Snapper
Red Porgy
Snowy Grouper
Base
No data lag
Depleted
Lightly fished
Regime change
Index biased
Index High CV
Index Low CV
SSB/SSBmsy
F/Fmsy
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Fixed TAC (10)
Fixed TAC (5)
Annual assessment
Averaged Index (10)