The following supplement accompanies the article

Spatiotemporal trends and drivers of fish condition in Chesapeake Bay

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Table S1. Parameterizations of the linear mixed effect (LME) models fitted to Fulton's *k* for species/size-classes with and without available age data. Sampling location was treated as a random effect in all models. Covariates are abbreviated as Y – year, C – cruise, R – region, A – age, and S – sex.

Model	Covariates
	Species/size-classes with age data
M_1	Y + C + R + A + S
M_2	Y + C + R + A
M_3	Y + C + R + S
M_4	Y + C + A + S
M_5	Y + C + R
M_6	Y + C + A
M_7	Y + C + S
M_8	Y + R + A
M_9	Y + R + S
	Species/size-classes without age data
m_1	Y + C + R + S
m_2	Y + C + R
m_3	Y + C + S
m_4	Y + R + S
m_5	Y + C
m_6	Y

Table S2. Statistics associated with LME model fits and model selection of the top two competing parameterizations for each species/size-class. The model with the lowest AIC was chosen for inference. Refer to Table S1 for covariate combinations included for each model.

Species	Model	-2log(L)	AIC	ΔAIC
Alewife	m_3	-219.2	-183.2	0.0
	m_4	-219.5	-179.5	3.7
Atlantic croaker	M_1	-7645.5	-7595.5	0.0
	M_2	-7632.2	-7584.2	11.3
Bluefish	M_2	-428.6	-380.6	0.0
	M_1	-428.7	-378.7	1.9
Gizzard shad	m_2	-383.2	-341.2	0.0
	m_1	-383.3	-339.3	1.9
Hogchoker	m_1	428.9	476.9	0.0
	m_2	431.0	477.0	0.1
Kingfishes	m_1	-1697.8	-1655.8	0.0
	m_4	-1689.0	-1653.0	2.8
Northern puffer	m_5	1548.1	1586.1	0.0
	m_3	1546.7	1586.7	0.6
Northern searobin	m_5	52.0	88.0	0.0
	m_2	51.7	89.1	1.1
Scup	m_5	585.6	623.6	0.0
	m_2	583.8	623.7	0.1
Silver perch	m_2	-116.5	-74.5	0.0
	m_1	-116.6	-72.6	1.9
Spot	M_2	-1404.3	-1356.3	0.0
	M_1	-1405.6	-1355.6	0.7
Striped bass	M_4	-5960.7	-5916.7	0.0
	M_6	-5957.9	-5915.9	0.8
S. flounder (all sizes)	M_1	-9380.8	-9332.8	0.0
	M_2	-9368.8	-9322.8	10.0
S. flounder (small)	M_6	-1949.3	-1909.3	0.0
	M_4	-1951.1	-1909.1	0.2
S. flounder (large)	M_1	-7581.2	-7533.2	0.0
	M_2	-7571.8	-7525.8	7.4
Weakfish (all sizes)	M_5	-8397.9	-8355.9	0.0
	M_2	-8398.8	-8354.8	1.1
Weakfish (large)	M_5	-8720.8	-8678.8	0.0
	M_3	-8721.0	-8677.0	1.8
White perch	M_1	-683.9	-635.9	0.0
	M_4	-664.5	-620.5	15.4
Windowpane flounder	m_1	-311.4	-267.4	0.0
	m_3	-307.5	-265.5	1.9

Table S3. Model structure, fit statistics, and model selection statistics associated with the DFA models fitted to each taxonomic group limited to models with ΔAICc < 10. Model structures denoted in *italics* were those selected for inference.

Covariates	m	R	-2log(L)	AICc	ΔAICc	Mean Fit
			ALL taxonomic group			
None	2	equal varcov	481.8	559.6	0.0	0.69
DO	1	equal varcov	481.2	561.8	2.2	0.70
Chl a	*1*	*diag & equal*	*487.7*	*565.5*	*5.9*	*0.45*
AMO	1	equal varcov	488.0	568.6	9.0	0.72
Chl *a*	1	equal varcov	488.2	568.8	9.2	0.44
Temp, Chl a	1	equal varcov	439.5	569.0	9.4	0.65
			BENTH taxonomic group			
None	*1*	*diag & equal*	*188.7*	*204.2*	*0.0*	*0.39*
None	1	equal varcov	186.4	204.3	0.1	0.62
Polychaete	1	equal varcov	173.9	208.0	3.8	0.55
None	2	diag & equal	182.0	210.4	6.2	0.24
None	1	diag & unequal	182.5	210.8	6.6	0.32
			PISC taxonomic group			
Chl *a*	1	diag & equal	132.2	154.1	0.0	0.42
Chl *a*	1	equal varcov	132.2	157.0	3.1	0.42
Chl a	*1*	*diag & unequal*	*127.6*	*158.9*	*4.8*	*0.38*
AMO	1	diag & equal	137.1	159.0	4.9	0.44
DO	1	diag & equal	137.3	159.3	5.2	0.46
None	1	diag & equal	148.7	159.9	5.8	0.59
			ZOOP taxonomic group			
Chl *a*	1	equal varcov	155.9	185.4	0.0	0.69
Chl a, Temp	*1*	*diag & equal*	*148.8*	*191.1*	*5.7*	*0.28*
None	1	equal varcov	175.8	191.6	6.2	0.79
Temp	1	equal varcov	162.9	192.3	6.9	0.66
Hypoxia	1	equal varcov	163.2	192.7	7.3	0.71
Chl *a*, Temp	1	equal varcov	148.8	194.5	9.1	0.27
Salinity	1	equal varcov	165.3	194.8	9.4	0.72

Table S4. Parameter estimates, standard errors, and 95% confidence intervals for the estimated parameters of the DFA model selected for inference for each species/size-class within each taxonomic group. Estimated loadings are given by γand covariate effects are given by *d*.

Species/size-class	Parameter	Estimate	SE	95% CI
ALL taxonomic group				
Alewife	γ	0.35	0.18	(0.01, 0.71)
	$d_{\text{chl a}}$	-0.54	0.19	(-0.92, -0.16)
Atlantic croaker	γ	0.56	0.19	(0.19,0.93)
	$d_{\text{chl a}}$	0.19	0.21	(-0.22, 0.59)
Bluefish	γ	0.29	0.17	(-0.03, 0.62)
	$d_{\text{chl a}}$	0.72	0.19	(0.32, 1.10)
Gizzard shad	γ	0.47	0.19	(0.10, 0.83)
	$d_{\text{chl a}}$	0.23	0.20	(-0.16, 0.62)
Hogchoker	γ	0.59	0.20	(0.20, 0.99)
	$d_{\text{chl a}}$	0.18	0.21	(-0.23, 0.59)
Kingfishes	γ	0.46	0.18	(0.11, 0.82)
	$d_{\text{chl a}}$	0.48	0.20	(0.09, 0.88)
N. puffer	γ	0.61	0.21	(0.21, 1.02)
	$d_{\text{chl a}}$	-0.22	0.21	(-0.63, 0.20)
N. searobin	γ	0.43	0.18	(0.07, 0.79)
	$d_{\text{chl a}}$	0.12	0.20	(-0.26, 0.51)
Scup	γ	0.56	0.19	(0.19, 0.93)
	$d_{\text{chl a}}$	0.11	0.21	(-0.31, 0.52)
Silver perch	γ	0.40	0.18	(0.05, 0.76)
	$d_{\text{chl a}}$	0.52	0.20	(0.14, 0.91)
Spot	γ	0.70	0.21	(0.29, 1.12)
	$d_{\text{chl a}}$	-0.04	0.21	(-0.45, 0.37)
Striped bass	γ	0.25	0.17	(-0.08, 0.57)
	$d_{\text{chl a}}$	-0.39	0.19	(-0.76, -0.02)
S. flounder (all sizes)	γ	0.61	0.20	(0.22, 1.01)
	$d_{\text{chl a}}$	0.18	0.21	(-0.23, 0.59)
Weakfish (all sizes)	γ	0.67	0.21	(0.27, 1.08)
	$d_{\text{chl a}}$	0.39	0.22	(-0.04, 0.81)
White perch	γ	0.59	0.20	(0.20, 0.97)
	$d_{\text{chl a}}$	-0.07	0.21	(-0.47, 0.34)
Windowpane flounder	γ	0.53	0.19	(0.15, 0.91)
	$d_{\text{chl a}}$	0.43	0.21	(0.03, 0.83)
BENTH taxonomic group				
Atlantic croaker	γ	0.53	0.17	(0.19, 0.87)
Hogchoker	γ	0.40	0.16	(0.08, 0.72)
N. puffer	γ	0.37	0.17	(0.04, 0.69)
Scup	γ	0.51	0.17	(0.18, 0.84)
Spot	γ	0.55	0.19	(0.18, 0.93)
White perch	γ	0.50	0.18	(0.16, 0.85)
PISC taxonomic group				
Bluefish	γ	0.34	0.18	(-0.01, 0.69)
	$d_{\text{chl a}}$	0.71	0.17	(0.37, 1.05)
Striped bass	γ	0.17	0.22	(-0.26, 0.60)
	$d_{\text{chl a}}$	-0.41	0.24	(-0.88, 0.06)
S. flounder (large)	γ	0.67	0.23	(0.22, 1.11)
	$d_{\text{chl a}}$	0.11	0.21	(-0.30, 0.52)

Weakfish (large)	γ	0.73	0.24	(0.25, 1.20)
	$d_{\text{chl a}}$	0.34	0.18	(-0.01, 0.69)
ZOOP taxonomic group				
Alewife	γ	0.53	0.21	(0.13, 0.93)
	$d_{\text{chl a}}$	-0.89	0.24	(-1.35, -0.43)
	d_{temp}	-0.58	0.24	(-1.04, -0.11)
N. searobin	γ	0.77	0.24	(0.30, 1.25)
	$d_{\text{chl a}}$	0.18	0.29	(-0.38, 0.75)
	d_{temp}	0.29	0.29	(-0.29, 0.85)
Silver perch	γ	0.63	0.22	(0.19, 1.07)
	$d_{\text{chl a}}$	0.39	0.26	(-0.11, 0.90)
	d_{temp}	-0.11	0.26	(-0.62, 0.39)
S. flounder (small)	γ	0.62	0.21	(0.21, 1.04)
	$d_{\text{chl a}}$	-0.25	0.25	(-0.75, 0.25)
	d_{temp}	-0.72	0.25	(-1.22, -0.22)
Windowpane flounder	γ	0.75	0.23	(0.29, 1.20)
	$d_{\text{chl a}}$	0.19	0.28	(-0.36, 0.74)
	d_{temp}	-0.29	0.28	(-0.84, 0.26)