Appendix A. Model Code for Hierarchical Bayesian von Bertalanffy growth model

```
model{
for(i in 1:n){
y[i] ~ dnorm(y.hat[i], tau.y)
y.hat[i] <- Linf[g[i]] * (1-exp(-k[g[i]] * (age[i] - t0[g[i]] )))
}

tau.y <- pow(sigma.y,-2)
sigma.y ~ dunif(0,100)

# Level-2 parameters
for(j in 1:J){
Linf[j] <- exp(B[j,1])
k[j] <- exp(B[j,2]) # log-scale
t0[j] <- exp(B[j,3])-10 # A constant of 10 is added (subtracted)
B[j,1:3] ~ dmnorm(B.hat[j,], Tau.B[,]) #Tau.B is a precision matrix
B.hat[j,1] <- mu.Linf
B.hat[j,2] <- mu.k
B.hat[j,3] <- mu.t0
}

#priors for level-2 parameters
mu.Linf ~ dnorm(0,.0001)
mu.k ~ dnorm(0,.0001)
```

```
mu.t0 ~ dnorm(0,.0001)

# Get grand mean k on untransformed scale
mu.k.raw <- exp(mu.k) #add basin covariate here
linf.raw <- exp(mu.Linf)
t0.raw <- exp(mu.t0)-10

# Variance-covariance matrix from precision matrix (i.e., 1/tau)
Tau.B[1:3,1:3] ~ dwish(W[,], df)
df <- 4 # df set to number of varying parameters + 1

Sigma.B[1:3, 1:3] <- inverse(Tau.B[,])

# Obtain sigmas from variance-covariance matrix Sigma.B
sigma.l <- sqrt(Sigma.B[1,1])
sigma.k <- sqrt(Sigma.B[2,2])
sigma.t <- sqrt(Sigma.B[3,3])

#correlation
rho[1] <- Sigma.B[1,2]/sqrt(Sigma.B[1,1]*Sigma.B[2,2])
rho[2] <- Sigma.B[1,3]/sqrt(Sigma.B[1,1]*Sigma.B[3,3])
rho[3] <- Sigma.B[2,3]/sqrt(Sigma.B[2,2]*Sigma.B[3,3])
}
```

Appendix B. Posterior distributions for female southern flounder.

Table B.5: Posterior means, medians, standard deviation (SD), and lower and upper (95%) credible intervals of parameters from the June–December female southern flounder von Bertalanffy growth model. The brackets following a parameter indicate the spatial grouping, which follow Table 2, where [1]=Pamlico Sound, NC, ... Parameters followed by '.raw' indicate the population-level estimates. Rhos and sigmas are also presented.

Parameter	Mean	Median	SD	2.5%	97.5%
Linf[1]	508.14	507.16	11.91	487.40	533.87
Linf[2]	485.31	477.40	45.49	420.03	596.23
Linf[3]	672.90	656.29	86.84	562.32	878.44
Linf[4]	749.78	742.25	59.83	655.00	888.65
Linf[5]	667.19	660.44	51.23	586.58	786.08
Linf[6]	684.12	681.96	29.38	632.62	747.68
Linf[7]	547.43	545.57	23.44	506.95	598.86
Linf[8]	517.43	513.31	30.32	470.45	588.43
Linf[9]	717.80	687.98	137.64	555.28	1058.55
Linf[10]	543.61	540.19	31.42	492.18	614.61
Linf[11]	621.79	605.80	80.52	514.72	822.53
linf.raw	605.36	601.02	68.85	481.76	754.04
k[1]	0.52	0.52	0.05	0.42	0.61
k[2]	0.81	0.77	0.27	0.39	1.46

k[3]	0.31	0.30	0.08	0.16	0.48
k[4]	0.27	0.26	0.04	0.18	0.35
k[5]	0.31	0.31	0.05	0.22	0.41
k[6]	0.29	0.29	0.03	0.24	0.34
k[7]	0.49	0.49	0.06	0.38	0.61
k[8]	0.54	0.54	0.10	0.35	0.76
k[9]	0.26	0.26	0.08	0.12	0.44
k[10]	0.57	0.57	0.09	0.41	0.75
k[11]	0.40	0.39	0.12	0.20	0.66
mu.k.raw	0.40	0.40	0.07	0.28	0.56
rho[1]	-0.35	-0.38	0.26	-0.77	0.21
rho[2]	-0.02	-0.02	0.28	-0.55	0.52
rho[3]	0.04	0.05	0.28	-0.50	0.57
sigma.k	0.52	0.50	0.14	0.32	0.85
sigma.l	0.35	0.34	0.08	0.23	0.55
sigma.t	0.31	0.30	0.07	0.21	0.48
sigma.y	45.53	45.53	0.41	44.74	46.34
t0[1]	-0.99	-0.99	0.11	-1.23	-0.79
t0[2]	-0.53	-0.51	0.24	-1.05	-0.09
t0[3]	-0.94	-0.91	0.34	-1.69	-0.38
t0[4]	-0.63	-0.63	0.15	-0.95	-0.38
t0[5]	-0.62	-0.61	0.12	-0.88	-0.40
t0[6]	-0.64	-0.64	0.06	-0.77	-0.52
t0[7]	-0.33	-0.32	0.10	-0.55	-0.15
t0[8]	-0.71	-0.69	0.19	-1.14	-0.39

t0[9]	-0.99	-0.95	0.34	-1.75	-0.41
t0[10]	-0.42	-0.42	0.10	-0.63	-0.24
t0[11]	-0.82	-0.79	0.30	-1.48	-0.32
t0.raw	-0.66	-0.70	0.90	-2.32	1.25