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Supplementary material

Connectivity, migration and recruitment in a catadromous fish

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Table S1. Model selection results for competing models comparing the effects of environmental covariates on the rate of downstream movement of congolli across fish tagged in freshwater (tributaries and lake) and estuarine habitats (Coorong) (full dataset)

The term 's' represents a smoother fitted to the environmental covariate (see text for details), and d.f. is degrees of freedom. The top-ranked model (ΔAICc = 0) is highlighted in bold. AICc, Akaike information criterion corrected for small sample sizes; ΔAICc, AICc difference between the most parsimonious and subsequent models; DOY, day-of-the year

Model	d.f.	AICc	ΔAICc	log-likelihood
s(DOY) + s(moon phase)	**5**	**257.7**	**0**	**–123.8**
s(DOY)	4	258.3	0.6	–125.1
s(DOY, by = Habitat) + s(moon phase) + Habitat	8	258.9	1.3	–121.4
s(DOY, by = Habitat) + Habitat	7	259.6	1.9	–122.8
s(DOY, by = Freshwater-Year) + s(moon phase) + Freshwater-Year	11	262.7	5	–120.3
s(DOY, by = Freshwater-Year) + Freshwater-Year	10	263.9	6.3	–121.9
s(temperature, by = Habitat1) + s(moon phase) + Habitat1	8	281.2	23.5	–132.5
s(temperature) + s(moon phase)	5	285	27.3	–137.5
s(temperature, by = Freshwater-Year) + s(moon phase) + Freshwater-Year	11	286.8	29.1	–132.3
s(temperature, by = Habitat1) + Habitat1	7	288.9	31.3	–137.4
s(temperature)	4	289.4	31.7	–140.7
s(temperature, by = Freshwater-Year) + Freshwater-Year	10	294.5	36.8	–137.2
s(moon phase)	3	306.7	49	–150.3
null	2	307.6	49.9	–151.8

Table S2. Model selection results for competing models comparing the effects of environmental covariates on the rate of downstream movement of congolli tagged only in tributaries

The term 's' represents a smoother fitted to the environmental covariate (see text for details), and d.f. is degrees of freedom. The top-ranked model (ΔAICc = 0) is highlighted in bold. AICc, Akaike information criterion corrected for small sample sizes; ΔAICc, AICc difference between the most parsimonious and subsequent models; DOY, day-of-the year

Model	d.f.	AICc	ΔAICc	log-likelihood
s(DOY) + s(moon phase)	**5**	**87.9**	**0**	**–38.9**
s(DOY)	4	88.5	0.5	–40.2
s(DOY, by = Year) + Year	7	88.9	0.9	–37.4
s(DOY) + s(per flow mag 5 day, by = Year) + Year	9	89.4	1.5	–35.6
s(DOY, by = Year) + s(moon phase) + Year	8	89.5	1.6	–36.7
s(DOY) + s(per flow mag daily, by = Year) + Year	9	90.3	2.3	–36
s(DOY) + s(per flow mag 5 day, by = Year) + s(moon phase) + Year	10	90.5	2.6	–35.1
s(DOY) + s(per flow mag 5 day) + s(moon phase)	7	90.6	2.6	–38.2
s(temperature) + s(per flow mag daily) + s(moon phase)	7	90.8	2.9	–38.3
s(DOY, by = Year) + s(per flow mag 5 day) + Year	9	91	3.1	–36.4
s(DOY, by = Year) + s(per flow mag 5 day) + s(moon phase) + Year	10	91.3	3.4	–35.5
s(DOY) + s(per flow mag 5 day) + s(moon phase)	7	91.7	3.8	–38.8
s(DOY, by = Year) + s(per flow mag daily) + Year	9	91.8	3.8	–36.8
s(temperature) + s(per flow mag 5 day) + s(moon phase)	7	91.9	3.9	–38.9
s(DOY) + s(per flow mag 5 day)	6	92.2	4.2	–40
s(DOY) + s(per flow mag daily)	6	92.4	4.5	–40.2
s(temperature) + s(per flow mag 5 day, by = Year) + s(moon phase) + Year	10	92.7	4.7	–36.2
s(DOY, by = Year) + s(per flow mag 5 day) + Year	11	93	5	–35.3
s(temperature, by = Year) + s(per flow mag 5 day) + s(moon phase) + Year	10	94	6.1	–36.8
s(DOY, by = Year) + s(per flow mag 5 day, by = Year) + s(moon phase) + Year	12	94.2	6.2	–34.9
s(DOY, by = Year) + s(per flow mag daily, by = Year) + Year	11	94.3	6.4	–36
s(temperature, by = Year) + s(per flow mag daily) + s(moon phase) + Year	10	94.6	6.6	–37.1
s(temperature) + s(per flow mag daily)	6	94.9	6.9	–41.4
s(temperature) + s(per flow mag daily, by = Year) + s(moon phase) + Year	10	94.9	6.9	–37.3
s(DOY, by = Year) + s(per flow mag daily, by = Year) + s(moon phase) + Year	12	96.1	8.1	–35.8
s(per flow mag 5 day, by = Year) + s(moonphase) + Year	8	96.3	8.3	–40
s(temperature) + s(per flow mag 5 day, by = Year) + Year	9	96.6	8.7	–39.2
s(temperature, by = Year) + s(per flow mag 5 day) + s(moon phase) + Year	12	96.8	8.9	–36.2
s(temperature, by = Year) + s(per flow mag daily) + Year	9	97.7	9.7	–39.7
s(per flow mag daily) + s(moon phase)	5	98	10	–43.9
s(temperature) + s(per flow mag daily)	6	98.2	10.3	–43
s(temperature) + s(per flow mag daily, by = Year) + Year	9	98.2	10.3	–40
s(temperature, by = Year) + s(per flow mag daily, by = Year) + s(moon phase) + Year	12	98.4	10.5	–37
s(per flow mag daily, by = Year) + Year	7	99.6	11.7	–42.7
s(per flow mag daily)	4	99.8	11.9	–45.9
s(per flow mag daily, by = Year) + s(moon phase) + Year	8	100	12	–41.9
s(temperature, by = Year) + s(per flow mag 5 day, by = Year) + Year	11	100.6	12.6	–39.1
s(per flow mag 5 day, by = Year) + Year	7	100.8	12.8	–43.3
s(temperature, by = Year) + s(per flow mag daily, by = Year) + Year	11	101	13	–39.3
s(temperature, by = Year) + s(per flow mag 5 day) + Year	9	101.3	13.3	–41.5
s(temperature)	4	102.5	14.5	–47.2
s(per flow mag 5 day)	4	104.3	16.4	–48.1
s(per flow mag 5 day) + s(moon phase)	5	104.5	16.6	–47.2
s(moon phase)	3	105.7	17.8	–49.9
s(temperature, by = Year) + Year	7	108.2	20.3	–47
intercept only (NULL)	2	109.1	21.1	–52.5