Wildlife Biology

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Appendix 1

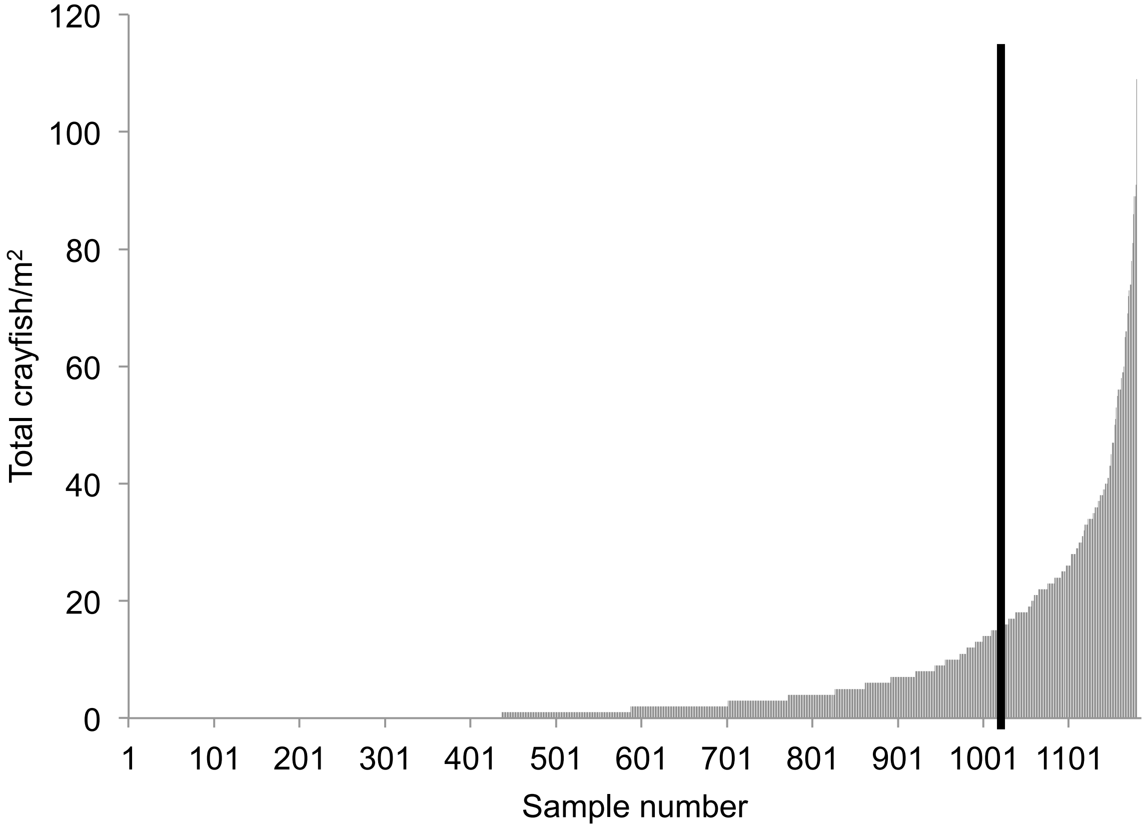

Figure A1. Crayfish densities ranked from smallest to largest. Twenty kick seine samples were collected at 59 sites (n = 1,180). The black line is the 85th percentile. Sites with ≥1 crayfish density to the right of the line (≥15 crayfish m^{-2}) were considered to contain a hotspot.

Appendix 2

An experiment conducted at 44 of our 59 study sites demonstrated that submerged vegetation cover was an important refuge for crayfish from aquatic and terrestrial predators in 2012 (Wolff 2013). Therefore, areas with high cover of submerged vegetation might indicate suitable places for mink to hunt for crayfish. Because we did not measure submerged vegetation in this study, we performed a post hoc analysis using the submerged vegetation data from the experiment to explore the relationship between submerged vegetation cover, presence of crayfish hotspots, and occupancy by mink.

Within-stream cover of submerged vegetation was measured at 44 sites from 23 July – 27 September, 2012, in four 1-m^2 areas spaced 50-m apart and 1 m from the stream bank (Wolff 2013). Submerged vegetation cover (%) was visually estimated to the nearest 5%, and included aquatic and non-aquatic vegetation and algae within the stream channel. We used the average of these four measurements as a measure of submerged vegetation cover for each site.

We used logistic regression to evaluate the effect of submerged vegetation cover on the presence–absence of crayfish hotspots. We also tested the effects of urbanization, riparian width, water depth, stream size (sizePC), number of woody accumulations, substrate particle size, and number of crayfish burrows on hotspot presence–absence. The presence of crayfish hotspots was related positively to amount of submerged vegetation cover ($\beta = 0.017$, SE = 0.008; $p = 0.041$) and negatively to sizePC ($\beta = -0.735$, SE = 0.369; $p = 0.046$). However, 83% of the variation in crayfish hotspots was not explained by submerged vegetation cover and stream size ($R^2 = 0.17$). SizePC alone is not a good predictor of occupancy by mink, and is important only when included with hotspot presence-absence in models (Table 3).

We evaluated submerged vegetation cover as a direct predictor of mink spatial distribution using occupancy modeling by restricting our analysis to the 44 sites for which we had submerged vegetation data. We substituted hotspot presence-absence with average submerged vegetation cover in our models to evaluate the ability of submerged vegetation to predict mink occupancy. Submerged vegetation cover was not a good predictor of mink occupancy, and crayfish hotspots remained the best predictor of mink occupancy (Table A1). Our analysis shows that although submerged vegetation cover is related positively to hotspot presence, submerged vegetation does not appear to be an important driver of mink occupancy.

Table A1. Ranking of occupancy models for American mink in Illinois based on Akaike's information criterion (AIC). Detection covariates included observer and rainfall for the seven days prior to each survey (rainfall). Occupancy covariates included submerged vegetation cover (subveg), presence–absence of a crayfish hotspot (hotspot), stream size (sizePC), and degree of urbanization. ΔAIC = AIC for a given model minus AIC for the best model. K = number of model parameters, w_i = Akaike weights, and LL is the log-likelihood.

Model	ΔAIC	w_i	K	–2×LL
ψ(hotspot, sizePC), p(observer, rainfall)	0	0.320	6	66.80
ψ(hotspot), p(observer, rainfall)	0.29	0.277	5	69.09
ψ(hotspot, sizePC, urbanization), p(observer, rainfall)	0.45	0.256	7	65.25
ψ(hotspot, urbanization), p(observer, rainfall)	1.72	0.136	6	68.52
ψ(.), p(observer, rainfall)	8.91	0.004	4	79.71
ψ(subveg, sizePC), p(observer, rainfall)	9.29	0.003	6	76.09
ψ(subveg), p(observer, rainfall)	9.98	0.002	5	78.78
ψ(subveg, sizePC, urbanization), p(observer, rainfall)	10.74	0.002	7	75.54
ψ(subveg, urbanization), p(observer, rainfall)	11.62	0.001	6	78.42