Table S1. Candidate models for the occurrence (*Ψ*) and detection (*p*) probabilities of a freshwater mussel assemblage, with Deviance Information Criterion (DIC) rankings and DIC difference in successive candidate models (ΔDIC). Model 2 was selected as the most plausible model for subsequent analyses; see Results for more information.

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| Model | Occurrence *(Ψ)* | Detection *(p)* | DIC | ΔDIC |
| 1. | intercept (species) | intercept only | 260.5 | 0.0 |
| 2. | intercept (species) + all *Ψ*covariates | intercept only | 260.8 | 0.3 |
| 3. | intercept only | intercept only | 267.0 | 6.5 |
| 4. | intercept + all *Ψ*covariates | intercept only | 271.7 | 11.2 |
| 5. | intercept (species) + all *Ψ*covariates | intercept + all *p*covariates | 287.4 | 26.9 |
| 6. | intercept (species) | intercept + all *p*covariates | 291.4 | 30.9 |
| 7. | intercept (species) + all *Ψ*covariates (species) | intercept only | 295.1 | 34.6 |
| 8. | intercept (species) + all *Ψ*covariates (species) | intercept + all *p*covariates | 296.8 | 36.3 |
| 9. | intercept only | intercept + all *p*covariates | 298.4 | 37.9 |
| 10. | intercept + all *Ψ*covariates (species) | intercept only | 303.7 | 43.2 |
| 11. | intercept + all *Ψ*covariates | intercept + all *p*covariates | 317.7 | 57.2 |
| 12. | intercept + all *Ψ*covariates (species) | intercept (species) + all *p*covariates | 344.7 | 84.2 |
| 13. | intercept + all *Ψ*covariates (species) | intercept + all *p*covariates | 344.7 | 84.2 |
| 14. | intercept (species) | intercept + all *p*covariates (species) | 668.7 | 408.2 |
| 15. | intercept + all *Ψ*covariates | intercept (species) | 671.5 | 411.0 |
| 16. | intercept (species) | intercept (species) | 683.4 | 422.9 |
| 17. | intercept (species) + all *Ψ*covariates | intercept (species) | 741.5 | 481.0 |
| 18. | intercept only | intercept (species) | 786.2 | 525.7 |
| 19. | intercept + all *Ψ*covariates (species) | intercept (species) | 794.7 | 534.2 |
| 20. | intercept (species) + all *Ψ*covariates (species) | intercept + all *p*covariates (species) | 844.8 | 584.3 |
| 21. | intercept (species) | intercept (species) + all *p*covariates | 877.1 | 616.6 |
| 22. | intercept only | intercept (species) + all *p*covariates | 880.4 | 619.9 |
| 23. | intercept + all *Ψ*covariates | intercept (species) + all *p*covariates | 938.6 | 678.1 |
| 24. | intercept (species) + all *Ψ*covariates | intercept + all *p*covariates (species) | 945.7 | 685.2 |
| 25. | intercept (species) + all *Ψ*covariates (species) | intercept (species) | 981.5 | 721.0 |
| 26. | intercept (species) + all *Ψ*covariates | intercept (species) + all *p*covariates | 1,071.6 | 811.1 |
| 27. | intercept (species) + all *Ψ*covariates (species) | intercept (species) + all *p*covariates | 1,291.9 | 1,031.4 |
| 28. | intercept (species) | intercept (species) + all *p*covariates (species) | 1,764.9 | 1,504.4 |
| 29. | intercept + all *Ψ*covariates (species) | intercept (species) + all *p*covariates (species) | 1,797.6 | 1,537.1 |
| 30. | intercept only | intercept + all *p*covariates (species) | 1,824.5 | 1,564.0 |
| 31. | intercept + all *Ψ*covariates (species) | intercept + all *p*covariates (species) | 1,979.6 | 1,719.1 |
| 32. | intercept + all *Ψ*covariates | intercept + all *p*covariates (species) | 1,991.6 | 1,731.1 |
| 33. | intercept (species) + all *Ψ*covariates (species) | intercept (species) + all *p*covariates (species) | 2,213.0 | 1,952.5 |
| 34. | intercept (species) + all *Ψ*covariates | intercept (species) + all *p*covariates (species) | 2,370.1 | 2,109.6 |
| 35. | intercept + all *Ψ*covariates | intercept (species) + all *p*covariates (species) | 2,589.6 | 2,329.1 |
| 36. | intercept only | intercept (species) + all *p*covariates (species) | 2,607.4 | 2,346.9 |