ELECTRONIC APPENDIX

This is the Electronic Appendix to the article

High dispersal in a frog species suggests that it is
vulnerable to habitat fragmentation

by

W. Chris Funk, Allison E. Greene, Paul Stephen Corn and Fred W. Allendorf

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Appendix A (Electronic appendix)

Table 1. Best-supported multistate capture-recapture models ($\Delta AIC_c \leq 4$) used to examine variation in survival and capture probabilities of Columbia spotted frogs. (Models include annual (i) and population (r) variation in survival (S) and capture (p) probabilities of juvenile (j) and adult (a) frogs. Movement probabilities between lower and upper populations are year- and population-specific in all models. Abbreviations: ΔAIC_c, difference between the Akaike information criterion value (AIC_c) of the given model and the model with the lowest AIC_c; K, number of parameters in the model.)

Basin	Model	ΔAIC_c	AIC_c weight	K
Keeler Creek	$S_{ji}S_{ai}p_j\,p_a^r$	0.00	0.39	33
	$S_{ji}S_{ai}\,p_j^r\,p_a^r$	0.37	0.32	34
	$S_j S_a^r\,p_{ji}^r\,p_{ai}^r$	3.25	0.08	39
	$S_j S_a\,p_{ji}^r\,p_{ai}^r$	3.54	0.07	38
	$S_j S_{ai}\,p_{ji}^r\,p_{ai}^r$	3.75	0.06	40
Marten Creek	$S_j^r\,S_a^r\,p_{ji}^r\,p_{ai}^r$	0.00	0.19	40
	$S_j^r\,S_a\,p_{ji}^r\,p_{ai}^r$	0.37	0.16	39
	$S_j^r\,S_a^r\,p_{ji}p_{ai}$	0.56	0.14	34
	$S_{ji}^r\,S_{ai}^r\,p_j p_a$	1.02	0.11	38
	$S_j^r\,S_a^r\,p_j p_{ai}$	1.71	0.08	32
	$S_{ji}^r\,S_{ai}^r\,p_j p_{ai}$	1.81	0.08	40

$S^r_{ji} \ S^r_{ai} \ p^r_j p_a$	2.67	0.05	39
$S^r_{ji} \ S^r_{ai} \ p_j \ p^r_a$	2.85	0.05	39

Table 2. Best-supported multistate capture-recapture models ($\Delta AIC_c \leq 4$) used to examine variation in movement probabilities of Columbia spotted frogs. (Models include annual (i) and population (rs) variation in movement (Ψ) probabilities of juvenile (j) and adult (a) frogs. In Keeler Creek, survival probability is year-specific for juveniles (S_{ji}) and adults (S_{ai}) and capture probability is constant for juveniles and population-specific for adults (p_a^r). In Marten Creek, survival probability is population-specific for juveniles (S_j^r) and adults (S_a^r) and capture probability is year- and population-specific for juveniles (p_{ji}^r) and adults (p_{ai}^r). Abbreviations: ΔAIC_c, difference between the Akaike information criterion value (AIC_c) of the given model and the model with the lowest AIC_c; K, number of parameters in the model.)

Basin	Model	ΔAIC_c	AIC_c weight	K
Keeler Creek	$\Psi_{ji}\ \Psi_a$	0.00	0.61	19
	$\Psi_{ji}\ \Psi_a^{rs}$	2.03	0.22	20
Marten Creek	$\Psi_{ji}^{rs}\ \Psi_a$	0.00	0.62	35
	$\Psi_{ji}^{rs}\ \Psi_a^{rs}$	2.02	0.22	36

Table 3. Mulitstate capture-recapture estimates for Columbia spotted frogs from Keeler

Creek, Montana.

(Annual survival (S), capture (p), and movement (Ψ) probabilities were estimated for

juveniles (j) and adults (a) for the lower (l) and upper (u) populations in Keeler Creek

from 2000 to 2003 using the best-fitting multistate model (table 2). Movement

probabilities are both population- (rs) and stage-specific.)

Parameter	Estimate	Standard Error	Lower 95% CI	Upper 95% CI
$S_{j_{2000}}$	0.32	0.11	0.15	0.55
$S_{j_{2001}}$	0.85	0.31	0.05	1.00
$S_{j_{2002}}$	0.25	0.11	0.10	0.51
$S_{a_{2000}}$	0.56	0.05	0.46	0.67
$S_{a_{2001}}$	0.77	0.07	0.62	0.88
$S_{a_{2002}}$	1.00	0.00	0.99	1.00
p_j	0.02	0.01	0.01	0.04
p_a^l	0.24	0.03	0.19	0.31
p_a^u	0.50	0.04	0.43	0.57
$\Psi_{2000}^{r_j s_j}$	0.29	0.12	0.12	0.56
$\Psi_{2001}^{r_j s_j}$	0.00	0.00	0.00	0.00
$\Psi_{2002}^{r_j s_j}$	0.49	0.19	0.18	0.81
$\Psi_{2000}^{r_j r_a}$	0.09	0.05	0.03	0.24

$\Psi_{2001}^{r_j r_a}$	0.03	0.02	0.01	0.10
$\Psi_{2002}^{r_j r_a}$	0.18	0.10	0.06	0.44
$\Psi_{2000}^{r_j s_a}$	0.00	0.00	0.00	0.00
$\Psi_{2001}^{r_j s_a}$	0.00	0.00	0.00	0.00
$\Psi_{2002}^{r_j s_a}$	0.00	0.00	0.00	0.00
$\Psi^{r_a s_a}$	0.00	0.00	0.00	0.00

Table 4. Mulitstate capture-recapture estimates for Columbia spotted frogs from Marten Creek, Montana.

(Annual survival (S), capture (p), and movement (Ψ) probabilities were estimated for juveniles (j) and adults (a) for the lower (l) and upper (u) populations in Marten Creek from 2000 to 2003 using the best-fitting multistate model (table 2).)

Parameter	Estimate	Standard Error	Lower 95% CI	Upper 95% CI
S_j^l	0.27	0.04	0.20	0.35
S_j^u	0.11	0.02	0.07	0.16
S_a^l	0.48	0.05	0.38	0.58
S_a^u	0.65	0.11	0.43	0.83
$p_{j_{2001}}^l$	0.32	0.20	0.07	0.75
$p_{j_{2002}}^l$	0.25	0.07	0.14	0.42
$p_{j_{2003}}^l$	0.16	0.04	0.09	0.25
$p_{j_{2002}}^u$	0.17	0.07	0.07	0.36
$p_{j_{2003}}^u$	1.00	0.00	0.99	1.00
$p_{a_{2001}}^l$	0.15	0.03	0.10	0.21
$p_{a_{2002}}^l$	0.24	0.04	0.17	0.33
$p_{a_{2003}}^l$	0.24	0.05	0.16	0.34
$p_{a_{2001}}^u$	0.17	0.06	0.08	0.33

$p^u_{a_{2002}}$	0.25	0.06	0.15	0.39
$p^u_{a_{2003}}$	0.35	0.09	0.19	0.54
$\Psi^{l_j u_j}_{2000}$	0.03	0.10	0.00	0.93
$\Psi^{l_j u_j}_{2001}$	0.05	0.03	0.01	0.16
$\Psi^{l_j u_j}_{2002}$	0.00	0.00	0.00	0.00
$\Psi^{l_j l_a}_{2000}$	0.56	0.13	0.31	0.79
$\Psi^{l_j l_a}_{2001}$	0.36	0.08	0.22	0.54
$\Psi^{l_j l_a}_{2002}$	0.27	0.08	0.15	0.44
$\Psi^{l_j u_a}_{2000}$	0.09	0.04	0.03	0.21
$\Psi^{l_j u_a}_{2001}$	0.04	0.02	0.02	0.09
$\Psi^{l_j u_a}_{2002}$	0.02	0.01	0.01	0.07
$\Psi^{u_j l_j}_{2000}$	0.29	0.25	0.04	0.81
$\Psi^{u_j l_j}_{2001}$	0.03	0.03	0.00	0.23
$\Psi^{u_j l_j}_{2002}$	0.18	0.14	0.04	0.58
$\Psi^{u_j u_a}_{2000}$	0.25	0.13	0.07	0.57
$\Psi^{u_j u_a}_{2001}$	0.25	0.10	0.11	0.48
$\Psi^{u_j u_a}_{2002}$	0.56	0.15	0.28	0.80
$\Psi^{u_j l_a}_{2000}$	0.33	0.18	0.09	0.71
$\Psi^{u_j l_a}_{2001}$	0.00	0.00	0.00	0.00

$\Psi_{2002}^{u_j l_a}$	0.07	0.07	0.01	0.39
$\Psi^{r_a s_a}$	0.00	0.00	0.00	0.00