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Supplementary material

APPENDIX A. COMPLETE MODEL LIST FOR RECRUITMENT AND POPULAITON GROWTH ANALYSES IN PROGRAM MARK

Table A1. Performance of Pradel capture-mark-recapture models for per-capita recruitment (*f*) of female Common Goldeneye (*Bucephala clangula*) in interior Alaska, from 1997-2010. Structure for survival (φ) and detection probability (*p*) were held constant across models as: φ = Year; *p* = Year. Model-averaged estimates reported in the main text include all models within 4 ΔAIC_c units of the top model.

Model[a]	**ΔAIC_c**[b]	**w_i**[c]	**Number Params**	**Dev.**
f (g * COGO occ $_{t-1}$)	0.00	0.79	20	186.94
f (g * T)	2.62	0.21	20	189.56
f (g * box occ $_{t-1}$)	15.28	0.00	20	202.21
f (g * dmass $_{t-1}$)	23.17	0.00	20	210.11
f (g * dband$_{t-2}$)	24.00	0.00	20	210.94
f (g * hen mass $_{t-1}$)	32.02	0.00	20	218.95
f (g * PRES $_{t-2}$)	38.38	0.00	20	225.32
f (g * box occ $_{t-2}$)	38.65	0.00	20	225.58
f (g * COGO occ $_{t-2}$)	43.41	0.00	20	230.34
f (g * hen mass $_{t-2}$)	44.34	0.00	20	231.28
f (g * phatch $_{t-1}$)	45.59	0.00	20	232.53
f (g * ANS $_{t-2}$)	47.48	0.00	20	234.42
f (g * dphi $_{t-1}$)	50.72	0.00	20	237.66
f (g * ATMP $_{t-1}$)	52.56	0.00	20	239.50
f (g * dband $_{t-1}$)	52.87	0.00	20	239.80
f (g * PDO $_{t-1}$)	53.23	0.00	20	240.16
f (g * PRES $_{t-1}$)	53.38	0.00	20	240.32
f (ANS $_{t-2}$)	55.46	0.00	18	246.64
f (g + ANS $_{t-2}$)	57.55	0.00	19	246.61
f (g * dmass $_{t-2}$)	57.92	0.00	20	244.86

f (PRES $_{t-2}$)	58.66	0.00	18	249.84
f (g * temp $_{t-2}$)	58.82	0.00	20	245.75
f (g * dphi $_{t-2}$)	59.02	0.00	20	245.96
f (dphi $_{t-1}$)	59.26	0.00	18	250.44
f (g * temp $_{t-1}$)	59.29	0.00	20	246.23
f (dphi $_{t-2}$)	59.80	0.00	18	250.98
f (.)	60.13	0.00	17	253.42
f (precip $_{t-2}$)	60.29	0.00	18	251.47
f (g * precip $_{t-1}$)	60.74	0.00	20	247.67
f (g + PRES $_{t-2}$)	60.77	0.00	19	249.84
f (box occ $_{t-1}$)	60.93	0.00	18	252.11
f (pNID $_{t-2}$)	60.95	0.00	18	252.12
f (phatch $_{t-1}$)	60.96	0.00	18	252.14
f (box occ $_{t-2}$)	61.00	0.00	18	252.18
f (hen mass $_{t-2}$)	61.01	0.00	18	252.19
f (T)	61.02	0.00	18	252.20
f (g * pNID $_{t-1}$)	61.04	0.00	20	247.98
f (dband $_{t-1}$)	61.11	0.00	18	252.29
f (hen mass $_{t-1}$)	61.14	0.00	18	252.32
f (g * precip $_{t-2}$)	61.14	0.00	20	248.08
f (g * ATMP $_{t-2}$)	61.28	0.00	20	248.21
f (PRES $_{t-1}$)	61.33	0.00	18	252.50
f (g + dphi $_{t-1}$)	61.33	0.00	19	250.39
f (temp $_{t-2}$)	61.40	0.00	18	252.58
f (g * PDO $_{t-2}$)	61.51	0.00	20	248.44
f (exp occ $_{t-2}$)	61.73	0.00	18	252.91
f (temp $_{t-1}$)	61.76	0.00	18	252.94
f (g + dphi $_{t-2}$)	61.85	0.00	19	250.92
f (WTMP $_{t-1}$)	61.89	0.00	18	253.07
f (ATMP $_{t-2}$)	61.93	0.00	18	253.11
f (PDO $_{t-2}$)	61.95	0.00	18	253.13
f (pNID $_{t-1}$)	61.96	0.00	18	253.14
f (g * pNID $_{t-2}$)	62.03	0.00	20	248.96
f (ATMP $_{t-1}$)	62.10	0.00	18	253.28

f (COGO occ $_{t-2}$)	62.11	0.00	18	253.29
f (WTMP $_{t-2}$)	62.11	0.00	18	253.29
f (g)	62.13	0.00	18	253.31
f (temp $_{t-1}$)	62.13	0.00	18	253.31
f (dband $_{t-2}$)	62.13	0.00	18	253.32
f (dmass $_{t-2}$)	62.14	0.00	18	253.32
f (exp occ $_{t-1}$)	62.20	0.00	18	253.38
f (PDO $_{t-1}$)	62.21	0.00	18	253.38
f (dmass $_{t-1}$)	62.21	0.00	18	253.39
f (phatch $_{t-2}$)	62.22	0.00	18	253.40
f (COGO occ $_{t-1}$)	62.23	0.00	18	253.41
f (ANS $_{t-1}$)	62.24	0.00	18	253.42
f (g * WTMP $_{t-1}$)	62.37	0.00	20	249.31
f (g + precip $_{t-2}$)	62.39	0.00	19	251.45
f (g + box occ $_{t-2}$)	62.93	0.00	19	252.00
f (g + phatch $_{t-1}$)	62.98	0.00	19	252.04
f (g + pNID $_{t-2}$)	63.00	0.00	19	252.06
f (g + box occ $_{t-1}$)	63.04	0.00	19	252.10
f (g + hen mass $_{t-2}$)	63.12	0.00	19	252.19
f (g + T)	63.14	0.00	19	252.20
f (g + dband $_{t-1}$)	63.21	0.00	19	252.27
f (g + hen mass $_{t-1}$)	63.26	0.00	19	252.32
f (g + temp $_{t-2}$)	63.42	0.00	19	252.48
f (g + PRES $_{t-1}$)	63.43	0.00	19	252.50
f (g + precip $_{t-1}$)	63.67	0.00	19	252.73
f (g + exp occ $_{t-2}$)	63.76	0.00	19	252.83
f (g + WTMP $_{t-1}$)	63.86	0.00	19	252.93
f (g + pNID $_{t-1}$)	63.94	0.00	19	253.00
f (g + ATMP $_{t-2}$)	63.96	0.00	19	253.02
f (g + PDO $_{t-2}$)	63.98	0.00	19	253.04
f (g + ATMP $_{t-1}$)	64.10	0.00	19	253.16
f (g + COGO occ $_{t-2}$)	64.10	0.00	19	253.16
f (g + WTMP $_{t-2}$)	64.14	0.00	19	253.20
f (g + dband $_{t-2}$)	64.14	0.00	19	253.20

f (g + temp $_{t-1}$)	64.14	0.00	19	253.21
f (g + dmass $_{t-2}$)	64.15	0.00	19	253.21
f (g * exp occ $_{t-2}$)	64.18	0.00	20	251.11
f (g + exp occ $_{t-1}$)	64.20	0.00	19	253.26
f (g + phatch $_{t-2}$)	64.21	0.00	19	253.27
f (g + PDO $_{t-1}$)	64.21	0.00	19	253.28
f (g + COGO occ $_{t-1}$)	64.21	0.00	19	253.28
f (g + dmass $_{t-1}$)	64.22	0.00	19	253.28
f (g + ANS $_{t-1}$)	64.24	0.00	19	253.31
f (g * ANS $_{t-1}$)	64.72	0.00	20	251.66
f (g * phatch $_{t-2}$)	64.79	0.00	20	251.73
f (g * WTMP $_{t-2}$)	66.08	0.00	20	253.02
f (g * exp occ $_{t-1}$)	66.29	0.00	20	253.23
f (yr)	67.67	0.00	25	243.88
f (g + yr)	69.73	0.00	26	243.78

[a]Model selection notation follows Burnham and Anderson (2002), in which (t) denotes time variation, (T) denotes a linear trend effect, (g) denotes a group effect (*in-situ* vs. unknown recruitment origin), (yr) denotes annual variation, (.) indicates that a parameter was held constant, and a + sign indicates an additive effect between two variables, whereas a * denotes an interaction. All covariates were z-standardized across years (mean = 0.0, S.D. = 1.0), with missing values assigned a 0. Time-varying covariates were applied to parameters with multiple lag effects, in relation to interval *t-1* to *t*. For example, a *t-1* subscript denotes conditions at the beginning of the interval. hen mass = annual average hen mass during mid-incubation adjusted for structural size and day of incubation, and year; box occ= annual proportion of occupied nest boxes; COGO occ = annual proportion of nest boxes occupied by goldeneyes; exp occ = annual proportion of total nest boxes occupied by goldeneyes with prior breeding experience; pNID = Annual peak (mode) goldeneye nest initiation date; phatch = annual peak (mode) goldeneye nest

hatch date; dphi = first-year survival, estimated using multistate models in Lawson et al. (2017); dmass = individual duckling mass recorded at hatch, standardized across years; dband = annual proportion of hatched goldeneye ducklings marked by the study; ANS = annual apparent nest success, the number of goldeneye nests in which at least one duckling hatched, divided by the total number of goldeneye nests (excluding "dump" nests); temp = average of monthly mean temperatures on the study area from April to September (i.e. breeding and brood-rearing); precip = total precipitation on the study area from April to September; PRES = sea level pressure (hPa) from $October_{t-1}$ to $March_t$ in purported wintering region; ATMP = air temperature (Celsius) from $October_{t-1}$ to $March_t$ in purported wintering region; WTMP = sea surface temperature (Celsius) from $October_{t-1}$ to $March_t$ in purported wintering region; PDO = Annual Pacific Decadal Oscillation index, averaged monthly mean values from $October_{t-1}$ to $March_t$.

[b]Difference in AIC_c, relative to minimum AIC_c

[c]Akaike weight (Burnham and Anderson 2002)

Table A2. Performance of Pradel capture-mark-recapture models for population growth (λ) of female Common Goldeneye (*Bucephala clangula*) in interior Alaska, from 1997-2010. Structure for survival (φ) and detection probability (*p*) were held constant across models as: φ = Year; *p* = Year. Model-averaged estimates reported in the main text include all models within 4 ΔAIC_C units of the top model.

Model[a]	**ΔAIC_c**[b]	**w_i**[c]	**Number Params**	**Dev.**
λ (g * T)	0.00	0.54	20	188.05
λ (g * dband $_{t-2}$)	0.92	0.34	20	188.97
λ (g * COGO occ $_{t-1}$)	3.12	0.11	20	191.17
λ (g * box occ $_{t-1}$)	10.15	0.00	20	198.21
λ (g * dmass $_{t-1}$)	14.73	0.00	20	202.78
λ (g * hen mass $_{t-1}$)	24.75	0.00	20	212.80
λ (g * PRES $_{t-2}$)	36.20	0.00	20	224.25
λ (g * box occ $_{t-2}$)	44.08	0.00	20	232.13
λ (g * PRES $_{t-1}$)	44.79	0.00	20	232.85
λ (g * hen mass $_{t-2}$)	44.96	0.00	20	233.01
λ (g * COGO occ $_{t-2}$)	45.38	0.00	20	233.43
λ (g * phatch $_{t-1}$)	46.30	0.00	20	234.35
λ (g * ANS $_{t-2}$)	52.05	0.00	20	240.11
λ (g * PDO $_{t-1}$)	54.61	0.00	20	242.66
λ (ANS $_{t-2}$)	55.37	0.00	18	247.67
λ (g * dband $_{t-1}$)	55.63	0.00	20	243.68
λ (g * dphi $_{t-1}$)	56.08	0.00	20	244.13
λ (g * ATMP $_{t-1}$)	56.34	0.00	20	244.40
λ (g + ANS $_{t-2}$)	57.49	0.00	19	247.67
λ (g * temp $_{t-1}$)	62.38	0.00	20	250.44
λ (dphi $_{t-1}$)	62.68	0.00	18	254.97
λ (g * dmass $_{t-2}$)	62.81	0.00	20	250.87
λ (g * temp $_{t-2}$)	63.28	0.00	20	251.33
λ (PRES $_{t-2}$)	63.64	0.00	18	255.93

λ (g + dphi $_{t-1}$)	64.19	0.00	19	254.37
λ (dphi $_{t-2}$)	64.45	0.00	18	256.74
λ (g * precip $_{t-2}$)	65.21	0.00	20	253.26
λ (g + PRES $_{t-2}$)	65.30	0.00	19	255.48
λ (g * dphi $_{t-2}$)	65.53	0.00	20	253.59
λ (g + dphi $_{t-2}$)	65.75	0.00	19	255.93
λ (T)	66.50	0.00	18	258.80
λ (dband $_{t-1}$)	66.78	0.00	18	259.08
λ (hen mass $_{t-1}$)	66.89	0.00	18	259.19
λ (PRES $_{t-1}$)	67.00	0.00	18	259.29
λ (hen mass $_{t-2}$)	67.03	0.00	18	259.32
λ (.)	67.44	0.00	17	261.85
λ (yr)	67.56	0.00	25	244.89
λ (box occ $_{t-2}$)	67.73	0.00	18	260.02
λ (box occ $_{t-1}$)	67.76	0.00	18	260.06
λ (precip $_{t-2}$)	67.84	0.00	18	260.14
λ (phatch $_{t-1}$)	67.94	0.00	18	260.24
λ (g + dband $_{t-1}$)	68.10	0.00	19	258.28
λ (exp occ $_{t-2}$)	68.12	0.00	18	260.42
λ (g + T)	68.12	0.00	19	258.30
λ (g)	68.34	0.00	18	260.64
λ (pNID $_{t-2}$)	68.50	0.00	18	260.79
λ (g + PRES $_{t-1}$)	68.54	0.00	19	258.72
λ (g + hen mass $_{t-1}$)	68.56	0.00	19	258.74
λ (g + box occ $_{t-2}$)	68.58	0.00	19	258.76
λ (g + hen mass $_{t-2}$)	68.58	0.00	19	258.76
λ (g * WTMP $_{t-1}$)	68.59	0.00	20	256.64
λ (PDO $_{t-2}$)	68.68	0.00	18	260.98
λ (temp $_{t-2}$)	68.83	0.00	18	261.13
λ (g * PDO $_{t-2}$)	68.88	0.00	20	256.93
λ (COGO occ $_{t-2}$)	68.88	0.00	18	261.18
λ (g + box occ $_{t-1}$)	68.92	0.00	19	259.09
λ (g * ATMP $_{t-2}$)	68.92	0.00	20	256.97
λ (g * pNID $_{t-1}$)	68.96	0.00	20	257.01

λ (phatch $_{t-2}$)	69.01	0.00	18	261.30
λ (pNID $_{t-1}$)	69.01	0.00	18	261.30
λ (ATMP $_{t-2}$)	69.06	0.00	18	261.35
λ (g + precip $_{t-2}$)	69.09	0.00	19	259.27
λ (g + phatch $_{t-1}$)	69.13	0.00	19	259.31
λ (g * precip $_{t-1}$)	69.14	0.00	20	257.19
λ (g + exp occ $_{t-2}$)	69.14	0.00	19	259.32
λ (exp occ $_{t-1}$)	69.23	0.00	18	261.53
λ (dband $_{t-2}$)	69.38	0.00	18	261.67
λ (ANS $_{t-1}$)	69.38	0.00	18	261.68
λ (WTMP $_{t-2}$)	69.41	0.00	18	261.71
λ (dmass $_{t-2}$)	69.42	0.00	18	261.71
λ (precip $_{t-1}$)	69.50	0.00	18	261.80
λ (COGO occ $_{t-1}$)	69.53	0.00	18	261.83
λ (PDO $_{t-1}$)	69.53	0.00	18	261.83
λ (temp $_{t-1}$)	69.54	0.00	18	261.83
λ (dmass $_{t-1}$)	69.54	0.00	18	261.83
λ (ATMP $_{t-1}$)	69.55	0.00	18	261.85
λ (WTMP $_{t-1}$)	69.55	0.00	18	261.85
λ (g + pNID $_{t-2}$)	69.63	0.00	19	259.81
λ (g + yr)	69.64	0.00	26	244.81
λ (g + PDO $_{t-2}$)	69.70	0.00	19	259.88
λ (g + pNID $_{t-1}$)	69.74	0.00	19	259.92
λ (g * phatch $_{t-2}$)	69.79	0.00	20	257.85
λ (g + temp $_{t-2}$)	69.82	0.00	19	259.99
λ (g + COGO occ $_{t-2}$)	69.86	0.00	19	260.04
λ (g * pNID $_{t-2}$)	70.07	0.00	20	258.12
λ (g + ATMP $_{t-2}$)	70.09	0.00	19	260.27
λ (g + exp occ $_{t-1}$)	70.10	0.00	19	260.28
λ (g + dband $_{t-2}$)	70.12	0.00	19	260.30
λ (g + phatch $_{t-2}$)	70.16	0.00	19	260.34
λ (g + dmass $_{t-2}$)	70.36	0.00	19	260.54
λ (g + ANS $_{t-1}$)	70.39	0.00	19	260.56
λ (g + WTMP $_{t-2}$)	70.40	0.00	19	260.57

λ (g + WTMP $_{t-1}$)	70.40	0.00	19	260.58
λ (g + dmass $_{t-1}$)	70.41	0.00	19	260.58
λ (g * exp occ $_{t-2}$)	70.42	0.00	20	258.47
λ (g + temp $_{t-1}$)	70.45	0.00	19	260.63
λ (g + COGO occ $_{t-1}$)	70.45	0.00	19	260.63
λ (g + ATMP $_{t-1}$)	70.45	0.00	19	260.63
λ (g + PDO $_{t-1}$)	70.45	0.00	19	260.56
λ (g + precip $_{t-1}$)	70.46	0.00	19	260.64
λ (g * exp occ $_{t-1}$)	71.31	0.00	20	259.36
λ (g * ANS $_{t-1}$)	71.36	0.00	20	259.41
λ (g * WTMP $_{t-2}$)	72.46	0.00	20	260.52

[a]Model selection notation follows Burnham and Anderson (2002), in which (t) denotes time variation, (T) denotes a linear trend effect, (g) denotes a group effect (*in-situ* vs. unknown recruitment origin), (yr) denotes annual variation, (.) indicates that a parameter was held constant, and a + sign indicates an additive effect between two variables, whereas a * denotes an interaction. All covariates were z-standardized across years (mean = 0.0, S.D. = 1.0), with missing values assigned a 0. Time-varying covariates were applied to parameters with multiple lag effects, in relation to interval *t-1* to *t*. For example, a *t-1* subscript denotes conditions at the beginning of the interval. hen mass = annual average hen mass during mid-incubation adjusted for structural size and day of incubation, and year, individual (random effect), and year (fixed effect) as explanatory variables; box occ= annual proportion of occupied nest boxes; COGO occ = annual proportion of nest boxes occupied by goldeneyes; exp occ = annual proportion of total nest boxes occupied by goldeneyes with prior breeding experience; pNID = Annual peak (mode) goldeneye nest initiation date; phatch = annual peak (mode) goldeneye nest hatch date; dphi = first-year survival, estimated using multistate models in Lawson et al. (2017); dmass = individual duckling mass recorded at hatch, standardized across years; dband = annual proportion of

hatched goldeneye ducklings marked by the study; ANS = annual apparent nest success, the number of goldeneye nests in which at least one duckling hatched, divided by the total number of goldeneye nests (excluding "dump" nests); temp = average of monthly mean temperatures on the study area from April to September (i.e., breeding and brood-rearing); precip = total precipitation on the study area from April to September; PRES = sea level pressure (hPa) from $October_{t-1}$ to $March_t$ in purported wintering region; ATMP = air temperature (Celsius) from $October_{t-1}$ to $March_t$ in purported wintering region; WTMP = sea surface temperature (Celsius) from $October_{t-1}$ to $March_t$ in purported wintering region; PDO = Annual Pacific Decadal Oscillation index, averaged monthly mean values from $October_{t-1}$ to $March_t$

[b]Difference in AIC_c, relative to minimum AIC_c

[c]Akaike weight (Burnham and Anderson 2002)

APPENDIX B. ESTIMATED AND DERIVED PARAMETERS FROM RECRUITMENT AND POPULATION GROWTH ANALYSES

Table B1. Model averaged detection probability (*p*) estimates (± SE) for adult female Common Goldeneyes (*Bucephala clangula*) in Interior Alaska from 1997-2010, from two separate Pradel capture-mark-recapture analyses, in which apparent survival (φ), and either per-capita recruitment (*f*) or population growth (λ) were also estimated. Females were assigned to one of two recruitment-origin groups: *in-situ* (IS) recruited individuals that were originally marked as ducklings and later encountered as breeding adults, and unknown individuals (UN) that were first encountered as unmarked adults. We considered a set of models in which *f* or λ were allowed to vary among years, and allowed for group effects, linear and quadratic temporal trends, time-varying covariates, and their interactions. Survival (φ) and detection probability (*p*) were held constant across models as: φ = Year; *p* = Year— with several constraints. We fixed detection probability to 1 for 1997, 1998, 2000, 2001, and 2005, as no previously marked individual was missed but encountered later on in the study during these years, which was confirmed by examining capture histories. However, we fixed *p* to 0 for 1997 and 1998 for the *in-situ* (IS) group, as no individuals were available for capture during these two intervals; though all other detection probability estimates between the two groups are the same. In fully time-dependent capture-mark recapture models φ and *p* are confounded in the final interval (Lebreton 1992), therefore, we constrained *p* to be equal for the penultimate and final intervals. As such, *p* for the final occasion (2010) is not shown. Model-averaged estimates for each analysis were derived using all models within 4 ΔAIC_C units of the top model (Tables 2, 3 in the main text; Burnham and Anderson 2002).

	***f* Models**		**λ Models**	
	p^{IS} ± SE	p^{UN} ± SE	p^{IS} ± SE	p^{UN} ± SE
1997	0	1	0	1
1998	0	1	0	1
1999	0.93 ± 0.06	0.93 ± 0.06	0.92 ± 0.07	0.92 ± 0.07
2000	1	1	1	1
2001	1	1	1	1
2002	0.88 ± 0.05	0.88 ± 0.05	0.89 ± 0.05	0.89 ± 0.05
2003	0.96 ± 0.04	0.96 ± 0.04	0.97 ± 0.03	0.97 ± 0.03
2004	0.96 ± 0.04	0.96 ± 0.04	0.96 ± 0.04	0.96 ± 0.04
2005	1	1	1	1
2008	0.92 ± 0.05	0.92 ± 0.05	0.93 ± 0.05	0.93 ± 0.05
2009	0.92 ± 0.04	0.92 ± 0.04	0.92 ± 0.04	0.92 ± 0.04

Table B2. Model averaged apparent survival (φ) estimates (± SE) for adult female Common Goldeneyes (*Bucephala clangula*) in Interior Alaska from 1997-2010, from two separate Pradel capture-mark-recapture analyses, in which per-capita recruitment (*f*) and population growth (λ) were also estimated. We considered a set of models in which *f* and λ were allowed to vary among years, and allowed for group effects, linear and quadratic temporal trends, time-varying covariates, and their interactions. Survival (φ) and detection probability (*p*) structures were held constant across models as: φ = Year; *p* = Year. In fully time-dependent capture-mark recapture models φ and *p* are confounded in the final interval (Lebreton 1992), therefore, we constrained φ to be equal for the penultimate and final intervals. As such, the final interval (2009-2010) is not shown. Model-averaged estimates for each analysis were derived using all models within 4 ΔAIC_C units of the top model (Tables 2, 3 in the main text; Burnham and Anderson 2002).

	***f* Models** φ ± SE	**λ Models** φ ± SE
1997	0.73 ± 0.07	0.69 ± 0.09
1998	0.63 ± 0.07	0.69 ± 0.06
1999	0.57 ± 0.08	0.63 ± 0.06
2000	0.77 ± 0.06	0.81 ± 0.05
2001	0.81 ± 0.06	0.76 ± 0.05
2002	0.75 ± 0.06	0.78 ± 0.05
2003	0.69 ± 0.06	0.72 ± 0.05
2004	0.72 ± 0.06	0.74 ± 0.05
2005	0.75 ± 0.04	0.72 ± 0.04
2008	0.69 ± 0.04	0.71 ± 0.04

Table B3. Overall population growth (λ^{POP}), seniority (γ), and λ^{POP} derived per-capita-recruitment (f) for adult female Common Goldeneyes (*Bucephala clangula*) in Interior Alaska from 1997-2010. We used the delta method (Powell 2007) to derive standard error estimates for all three parameters. Females were assigned to one of two recruitment-origin groups: *in-situ* (IS) recruited individuals that were originally marked as ducklings and later encountered as breeding adults, and unknown individuals (UN) that were first encountered as unmarked adults. In a Pradel capture-mark-recapture analysis (Pradel 1996), we estimated group-specific population growth (Fig. 1), detection probability (Table B1), and overall survival (Table B2). We multiplied the model-averaged annual group-specific estimates of λ (λ^{IS} and λ^{UN}) by the respective annual proportion of individuals captured in each group at the beginning of the interval and added the products together to derive an overall estimate of annual population growth (λ^{POP}). We then input λ^{POP} and model-averaged survival estimates from the lambda analysis (Table B2) into Equation 1 to estimate the seniority parameter (γ), defined as the probability that individual present in year *t* was also present in year *t-1* (Pradel 1996, Nichols 2000), thus, γ represents the proportion of the population that is not new recruits.

$$\gamma_{t+1} = \phi_t \div \lambda_t^{POP} \qquad (1)$$

We then derived a new population-level per-capita-recruitment estimate (f^{POP}) using λ^{POP} and the model-averaged survival estimates from the population growth analysis using Equation 2.

$$f_t^{POP} = \lambda_t^{POP} - \phi_t \qquad (2)$$

	λ^{POP} ± SE	γ ± SE	f^{POP} ± SE
1997	1.03 ± 0.24	–	0.34 ± 0.28
1998	0.92 ± 0.07	0.67 ± 0.18	0.22 ± 0.23

1999	0.98 ± 0.05	0.76 ± 0.09	0.35 ± 0.36
2000	1.06 ± 0.05	0.64 ± 0.08	0.25 ± 0.24
2001	1.09 ± 0.05	0.77 ± 0.08	0.34 ± 0.34
2002	1.13 ± 0.04	0.69 ± 0.07	0.35 ± 0.35
2003	1.14 ± 0.09	0.69 ± 0.06	0.42 ± 0.41
2004	1.13 ± 0.11	0.63 ± 0.08	0.39 ± 0.38
2005	0.99 ± 0.05	0.65 ± 0.09	0.27 ± 0.27
2008	0.92 ± 0.12	0.72 ± 0.06	0.21 ± 0.12
2009	1.07 ± 0.14	0.77 ± 0.15	0.37 ± 0.31