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Supplementary Online Material for

PREDICTORS OF JUVENILE SURVIVAL IN BIRDS

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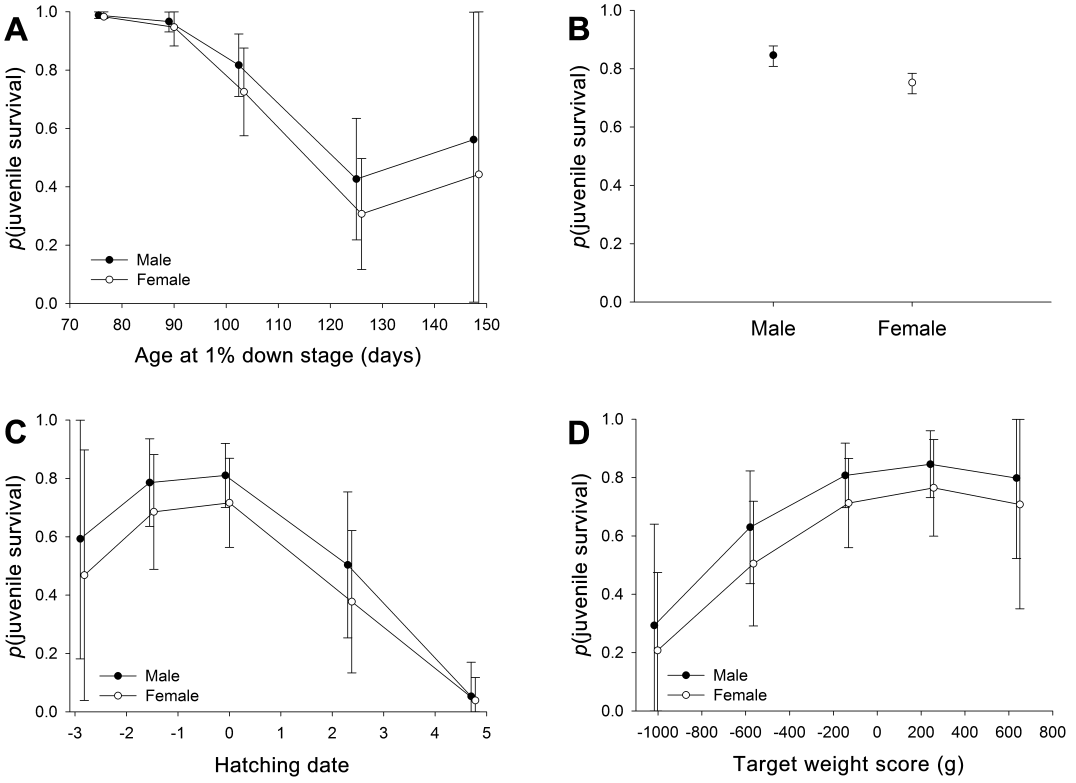

FIG. S1 Continued.

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FIG. S1. Continued.

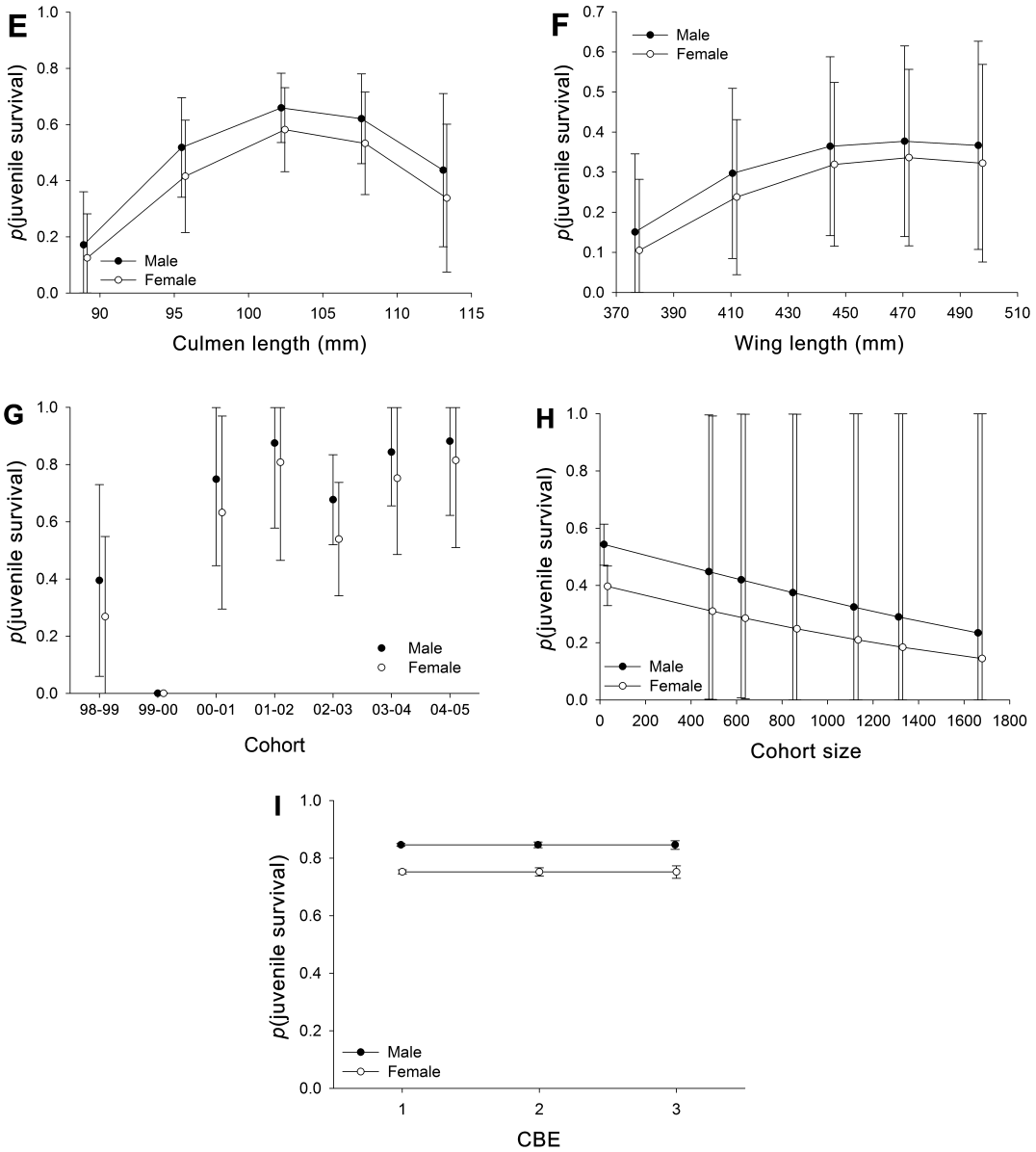

FIG. S1. Effects of individual predictor variables on juvenile survival probabilities in male and female fledgling Nazca Boobies, determined from a capture–mark–recapture analysis performed in Program MARK (Burnham and Anderson 2002). To show the effects of individual predictors, the chosen variable was allowed to vary across the range of values for that variable while other predictor variables in the model were held at their mean values. Error bars are 95% confidence intervals calculated from unconditional variance estimates (Anderson 2008). Shown are the effects on juvenile survival probability of (A) age at 1% down stage; (B) sex; (C) hatching date, expressed as standard deviations from a given year's *z*-score (see text); (D) target weight score; (E) culmen length; (F) wing length; (G) cohort; (H) cohort size; and (I) clutch–brood effect (CBE).

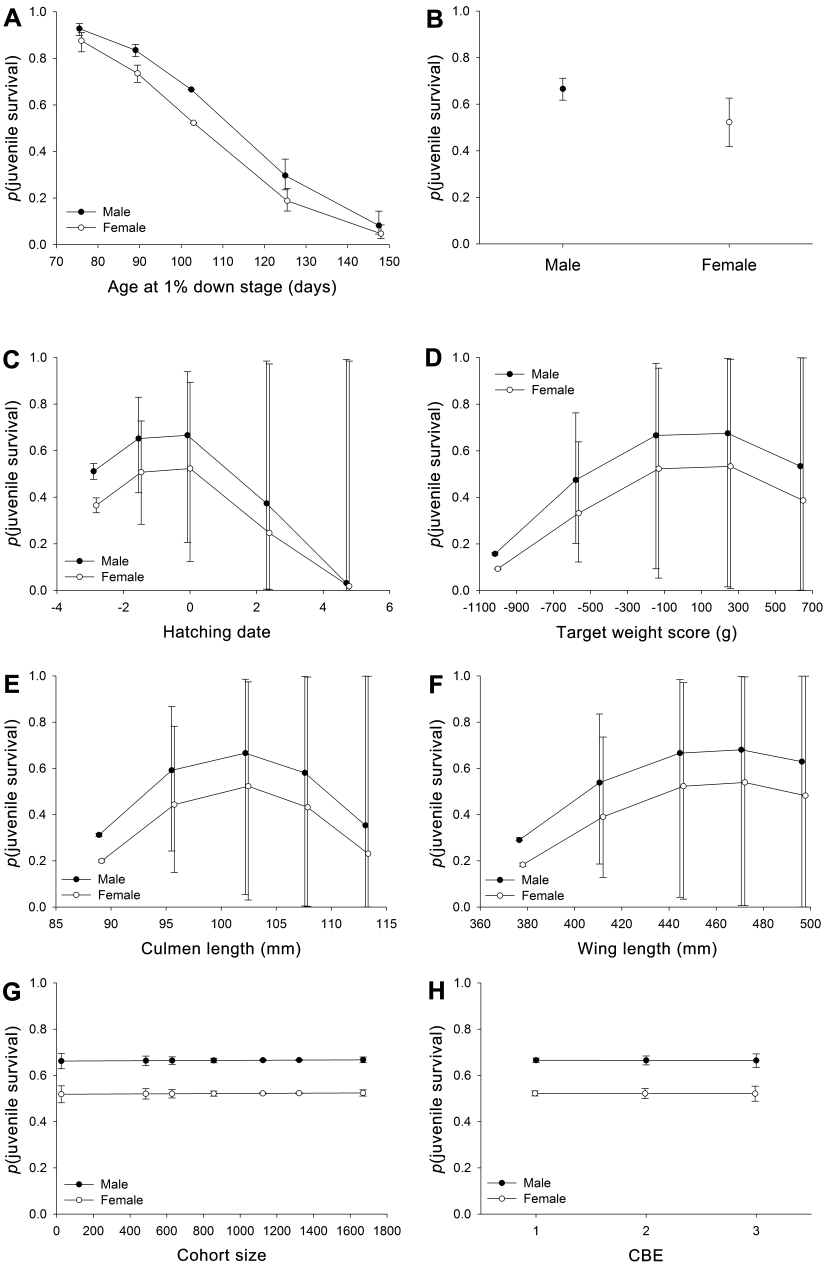

FIG. S2. Effects of individual predictor variables on juvenile survival probabilities in male and female fledgling Nazca Boobies, determined from a logistic regression. To show the effects of individual predictors, the chosen variable was allowed to vary across the range of values for that variable while other predictor variables in the model were held at their mean values. Error bars are 95% confidence intervals calculated from unconditional variance estimates that included a correction for model uncertainty (Anderson 2008). Shown are effects on juvenile survival probability of (A) age at 1% down stage; (B) sex; (C) hatching date, expressed as standard deviations from a given year's *z*-score (see text); (D) target weight score; (E) culmen length; (F) wing length; (G) cohort size; and (H) clutch–brood effect (CBE).

TABLE S1. Studies in Table 1 that met or did not meet 11 criteria, and reasons for exclusion. The criteria are referred to by number, as follows. (1) Offspring characters of individual offspring (not pooled by brood or other group) were used as predictor variables. (2) Morphological measures of individual offspring were measured near the end of parental care or when growth was approximately complete (often around the time of nest-leaving in altricial species). (3) Individual fledglings were followed from independence or just before independence to breeding age (survival to some point in the juvenile period does not meet this criterion). (4) There was high natal philopatry or, alternatively, dispersal areas were included in the analysis. (5) Offspring sex was known (or, alternatively, known sex differences in size or dispersal were controlled) and used in the analysis. (6) Sample size was sufficient for the analysis attempted (for example, logistic regression requires that the smaller of the classes of the dependent variable have ≥10 cases per parameter in the model). (7) No highly correlated predictors were used in the same model unless the model was designed to accommodate them (if a study used multiple predictors but did not give information on their possible correlation, we assumed that they were not correlated and did not exclude on the basis of this criterion). (8) If multiple statistical tests were performed, the critical values were adjusted for multiple comparisons. (9) Known surviving birds were not considered nonsurvivors (this problem arises, for example, when "surviving" birds are limited to dead band recoveries after the juvenile period, culls, or a subset of the living banded population). (10) More than 1 year of data was used in the analysis, because differences in the quality of the year might alter the relative importance of some variables on survival. And (11) the study was done under approximately natural conditions (e.g., supplemental food was not supplied). Numbers with an "a" following them indicate that we cannot evaluate this criterion with information provided in the study and that this criterion may pose a problem. Study citations refer to the monograph's Literature Cited.

Species	Met criteria?	Study	Reason for exclusion
Willow Ptarmigan (*Lagopus lagopus*)	No	Martin and Hannon 1987	2, 5, 8
Snow Goose (*Chen caerulescens*)	No	Cooke et al. 1984	5
	Yes	Cooch 2002	
	Yes	Reed et al. 2003	
	No	Menu et al. 2005	1, 3
	No	Francis et al. 1992	1, 2, 4, 9
Emperor Goose (*Chen canagica*)	No	Schmutz 1993	2, 3, 10
Barnacle Goose (*Branta leucopsis*)	No	Owen and Black 1989	3
	No	Shorrocks et al. 1998	3
Mallard (*Anas platyrhynchos*)	No	Dzus and Clark 1998	1
American Black Duck (*Anas rubripes*)	No	Longcore et al. 1991	3
Northern Shoveler (*Anas clypeata*)	No	Blums et al. 2002	1
Common Pochard (*Aythya ferina*)	No	Blums et al. 2002	1
Tufted Duck (*Aythya fuligula*)	No	Blums et al. 2002	1
Lesser Scaup (*Aythya affinis*)	No	Dawson and Clark 2000	1
Wood Duck (*Aix sponsa*)	No	Hepp et al. 1989	2, 3
Rock Pigeon (*Columba livia*)	No	Hetmański 2007	4, 5
	No	Hetmański and Barkowska 2008	4, 5
Eurasian Collared-Dove (*Streptopelia decaocto*)	No	Eraud et al. 2011	3, 4, 10
Great Spotted Cuckoo (*Clamator glandarius*)	No	Soler et al. 1994	3, 4, 5
Eurasian Coot (*Fulica atra*)	No	Brinkhof et al. 1997	4, 5
Houbara Bustard (*Chamydotis undulata*)	No	Chargé et al. 2011	7a, 11
Great Bustard (*Otis tarda*)	**Yes**	Martín et al. 2007	
Short-tailed Shearwater (*Puffinus tenuirostris*)	No	Meathrel and Carey 2007	4, 5
Manx Shearwater (*Puffinus puffinus*)	No	Perrins 1966, Perrins et al. 1973	5

(*continued*)

TABLE S1. Continued.

Species	Met criteria?	Study	Reason for exclusion
Sooty Shearwater (*Puffinus griseus*)	No	Sagar and Horning 1998	4, 5
Wandering Albatross (*Diomedea exulans*)	No	Weimerskirch et al. 2000	8, 10
Little Penguin (*Eudyptula minor*)	No	Reilly and Cullen 1982	5, 9
	No	Johannesen et al. 2003	3, 5
Yellow-eyed Penguin (*Megadyptes antipodes*)	No	McClung et al. 2004	3, 5
Gentoo Penguin (*Pygoscelis papua*)	No	Williams and Croxall 1991	3, 4a, 5
King Penguin (*Aptenodytes patagonicus*)	No	Olsson 1997	4
	Yes	Saraux et al. 2011	
Wood Stork (*Mycteria americana*)	No	Hylton et al. 2006	2, 6
Little Egret (*Egretta garzetta*)	No	Hafner et al. 1998	5
European Shag (*Phalacrocorax aristotelis*)	No	Harris et al. 1994	5
Cape Gannet (*Morus capensis*)	No	Jarvis 1974	3 (for weight), 9
Nazca Booby (*Sula granti*)	**Yes**	Present study	
Herring Gull (*Larus argentatus*)	No	Nisbet and Drury 1972	4, 5, 9
	No	Parsons et al. 1976	4, 5, 9
Western Gull (*Larus occidentalis*)	No	Spear and Nur 1994	3, 4, 5
Black-legged Kittiwake (*Rissa tridactyla*)	No	Coulson and Porter 1985	4, 5, 8
	No	Cam et al. 2003	4, 5
Common Tern (*Sterna hirundo*)	**Yes**	Braasch et al. 2009	
	No	Schauroth and Becker 2008	3, 7a
Sooty Tern (*Onychoprion fuscatus*)	No	Feare 2002	3, 4, 5
Sandwich Tern (*Thalasseus sandvicensis*)	No	Stienen and Brenninkmeijer 2002	4, 5, 9
Black-fronted Tern (*Childonias albostriatus*)	No	Keedwell 2003	3, 4, 5, 8, 10
Common Guillemot (*Uria aalge*)	No	Hedgren 1981	2, 5, 9
	No	Harris et al. 1992	2, 3, 5
	No	Harris et al. 2007	2, 5
Thick-billed Murre (*Uria lomvia*)	No	Hipfner 2001	2, 5
Razorbill (*Alca torda*)	No	Lloyd 1979	2, 5
Ancient Murrelet (*Synthliboramphus antiquus*)	No	Gaston 1997	2, 4
Antlantic Puffin (*Fratercula arctica*)	No	Harris and Rothery 1985	4, 5, 8
Tufted Puffin (*Fratercula cirrhata*)		Morrison et al. 2009	4, 5, 7a
Great Skua (*Stercorarius skua*)	No	Catry et al. 1998	5, 9
Parasitic Jaeger (*Stercorarius parasiticus*)	No	Phillips and Furness 1998	4, 5
Eurasian Oystercatcher (*Haematopus ostralegus*)	No	Kersten and Brenninkmeijer 1995	5
Laughing Kookaburra (*Dacelo novaeguineae*)	No	Legge 2002	4, 6
Middle Spotted Woodpecker (*Dendrocopus medius*)	No	Robles et al. 2007	4, 6
Burrowing Owl (*Athene cunicularia*)	No	Todd et al. 2003	3, 8

(*continued*)

TABLE S1. Continued.

Species	Met criteria?	Study	Reason for exclusion
	No	Davies and Restani 2006	3, 6, 7a
Tawny Owl (*Strix aluco*)	No	Sasvári and Hegyi 2010	1, 4, 5
Eurasian Sparrowhawk (*Accipiter nisus*)	No	Newton and Moss 1986	4, 8
Northern Goshawks (*Accipiter gentilis*)	No	Wiens et al. 2006	3, 6, 7a
Egyptian Vulture (*Neophron percnopterus*)	**Yes**	Grande et al. 2009	11a
Prairie Falcon (*Falco mexicanus*)	No	McFadzen and Marzluff 1996	1, 3, 4, 7a
Eastern Kingbird (*Tyrannus tyrannus*)	No	Dolan et al. 2009	6
Black-crowned Antshrike (*Thamnophilus atrinucha*)	No	Tarwater et al. 2011	4, 6, 7, 10
Brown Thornbill (*Acanthiza pusilla*)	No	Green and Cockburn 2001	5, 6, 7a
Spotted Antbird (*Hylophylax naevioides*)	No	Styrsky et al. 2005	3, 5a
Great Tit (*Parus major*)	No	Perrins 1965	3, 5
	No	Dhondt 1979	1, 3, 10
	No	Garnett 1981	3, 4, 5
	No	Smith et al. 1989 (regarding size measures)	1, 3, 5
	No	Smith et al. 1989 (regarding timing and brood size)	5
	No	Tinbergen and Boerlijst 1990	5
	No	Lindén et al. 1992	4, 5, 7a
	No	Verhulst and Tinbergen 1991,Verhulst et al. 1995	1991: 4, 5, 6, 10; 1995: 4, 5, 6
	Yes	Verboven and Visser 1998	5a (capture technique biased toward fems)
	No	Both et al. 1999	5
	No	Monrós et al. 2002	4, 5
	No	Greño et al. 2008	4, 5
	No	Norte et al. 2008	4, 5, 6, 7
	No	van Noordwijk et al. 1988	3, 4, 5
	No	Naef-Daenzer et al. 2001	3, 4, 5, 7a
Coal Tit (*Periparus ater*)	No	Naef-Daenzer et al. 2001	3, 4, 5, 7a
	No	Dietrich et al. 2003	1, 4, 10
Blue Tit (*Cyanistes caeruleus*)	No	Nur 1984	5, 10
	No	Svensson 1997	1, 3, 5, 8
	No	Råberg et al. 2005	3
Long-tailed Tit (*Aegithalos caudatus*)	No	MacColl and Hatchwell 2003	5
Common House Martin (*Delichon urbica*)	No	Christe et al. 2001	5, 8, 10
Purple Martin (*Progne subis*)	No	Tarof et al. 2011	4, 5
Barn Swallow (*Hirundo rustica*)	No	Grüebler and Naef-Daenzer 2010	3, 4, 5, 7a

(*continued*)

TABLE S1. Continued.

Species	Met criteria?	Study	Reason for exclusion
	No	Grüebler and Naef-Daenzer 2008	3, 4, 5, 7a
Tree Swallow (*Tachycineta bicolor*)	No	De Steven 1980	1
	No	Shutler et al. 2006	4, 5a, 8
Cliff Swallow (*Petrochelidon pyrrhonota*)	No	Brown and Brown 1999	1, 4, 5
Sociable Weaver (*Philetairus socius*)	No	Covas et al. 2002	5
Stitchbird (*Notiomystis cincta*)	No	Low and Pärt 2009	11
Akepa (*Loxops coccineus*)	No	Medeiros and Freed 2009	5
American Dipper (*Cinclus mexicanus*)	No	Middleton and Green 2008	4, 6, 7
Collared Flycatcher (*Ficedula albicollis*)	No	Gustafsson and Sutherland 1988	5
	No	Lindén et al. 1992	4, 5a, 7a
	No	Kruuk et al. 2002	1 (but OK for timing and year)
European Pied Flycatcher (*Ficedula hypoleuca*)	No	Potti and Montalvo 1991	4, 5a, 8
	No	Potti et al. 2002	4, 10
	No	Lobato et al. 2005	4, 6, 7a, 10
	No	Moreno et al. 2005	4, 5a, 8
	No	Alatalo and Lundberg 1986	4, 8, 10 [a]
Puff-throated Bulbul (*Alophoixus pallidus*)	No	Sankamethawee et al. 2009	3, 4, 6
Ovenbird (*Seiurus aurocapilla*)	No	Vitz and Rodewald 2011	3, 4, 5, 7a
Worm-eating Warbler (*Helmitheros vermivorum*)	No	Vitz and Rodewald 2011	3, 4, 5, 7a
Karoo Scrub Robin (*Cercotrichas coryphaeus*)	No	Lloyd et al. 2009	3, 4, 5
House Sparrow (*Passer domesticus*)	No	Ringsby et al. 1998	5
	No	Schwagmeyer and Mock 2008	4, 5a
	Yes	Cleasby et al. 2010	
Savannah Sparrow (*Passerculus sandwichensis*)	No	Ross and McLaren 1981	5, 8
	Yes	Wheelwright et al. 2003	7a
Song Sparrow (*Melospiza melodia*)	No	Hochachka and Smith 1991	5
Lark Bunting (*Calamospiza melanocorys*)	No	Yackel Adams et al. 2006	3, 4, 5, 7a
Dunnock (*Prunella modularis*)	No	Davies 1986	3, 4, 5
Yellow-eyed Junco (*Junco phaenotus*)	No	Sullivan 1989	3, 4, 5
Cactus Wren (*Campylorhynchus brunneicapillus*)	No	Simons and Martin 1990	3, 4, 5
Dickcissel (*Spiza americana*)	No	Suedkamp Wells et al. 2007	3, 4, 5
	No	Berkeley et al. 2007	3, 4, 5
Wood Thrush (*Hylocichla mustelina*)	No	Anders et al. 1997	3, 5
	No	Brown and Roth 2004	4, 5
Eurasian Blackbird (*Turdus merula*)	No	Magrath 1991	4, 5
	No	Snow 1958	3, 4, 5, 8

(*continued*)

TABLE S1. Continued.

Species	Met criteria?	Study	Reason for exclusion
Red-backed Shrike (*Lanius collurio*)	No	Müller et al. 2005	4, 5
Eastern Meadowlark (*Sturnella magna*)	No	Kershner et al. 2004	3, 5
	No	Suedkamp Wells et al. 2007	3, 4, 5
European Starling (*Sturnus vulgaris*)	No	Stromberg et al. 1988	3, 4, 5, 11
	No	Krementz et al. 1989	3, 5, 10
Spotless Starling (*Sturnus unicolor*)	No	López-Rull et al. 2011	4, 7a
Hooded Crow (*Corvus cornix*)	No	Loman 1977	3, 4, 5, 8
Carrion Crow (*Corvus corone*) (Not a direct test)	No	Richner 1992	4, 8
Florida Scrub-Jay (*Aphelocoma coerulescens*)	No	Mumme 1992	3, 5, 8
European Magpie (*Pica pica*)	No	Ponz Miranda et al. 2007	5, 6
	No	Husby and Slagsvold 1992	3, 4, 8
	Yes	Molina-Morales et al. 2012	

[a] Multiple years were used, but all individuals were pooled without assessing year effect.

TABLE S2. Developmental mode and annual adult survival (AAS) estimate for all species listed in Table 1. Longevity was binned into four categories: very short (AAS ≤ 0.60), short (0.60 < AAS ≤ 0.08), medium (0.08 < AAS ≤ 0.87), and long (AAS > 0.87).

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Willow Ptarmigan (*Lagopus lagopus*)	Precocial	0.39–0.57	Very short	Hannon, S. J., P. K. Eason and K. Martin. 1998. Willow Ptarmigan (*Lagopus lagopus*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Snow Goose (*Chen caerulescens*)	Precocial	0.88–0.94	Long	Mowbray, T. B., F. Cooke, and B. Ganter. 2000. Snow Goose (*Chen caerulescens*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Emperor Goose (*Chen canagica*)	Precocial	0.80–0.85	Medium	Schmutz, J., M. R. Petersen, J. A. Schmutz, and R. F. Rockwell. 2011. Emperor Goose (*Chen canagica*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.

(*continued*)

TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Barnacle Goose (*Branta leucopsis*)	Precocial	0.91	Long	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Mallard (*Anas platyrhynchos*)	Precocial	0.54–0.68	Short	Drilling, N., R. Titman, and F. McKinney. 2002. Mallard (*Anas platyrhynchos*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
American Black Duck (*Anas rubripes*)	Precocial	0.61–0.67	Short	Longcore, J. R., D. G. McAuley, G. R. Hepp, and J. M. Rhymer. 2000. American Black Duck (*Anas rubripes*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Northern Shoveler (*Anas clypeata*)	Precocial	0.58	Very short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Common Pochard (*Aythya ferina*)	Precocial	0.65	Short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Tufted Duck (*Aythya fuligula*)	Precocial	0.71	Short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Lesser Scaup (*Aythya affinis*)	Precocial	0.48–0.54	Very short	Austin, J. E., C. M. Custer, and A. D. Afton. 1998. Lesser Scaup (*Aythya affinis*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Wood Duck (*Aix sponsa*)	Precocial	0.55	Very short	Hepp, G. R., and F. C. Bellrose. 1995. Wood Duck (*Aix sponsa*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.

(*continued*)

TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Rock Pigeon (*Columba livia*)	Altricial	0.67	Short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Eurasian Collared-Dove (*Streptopelia decaocto*)	Altricial	0.64	Short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Great Spotted Cuckoo (*Clamator glandarius*)	Altricial	0.63	Short	[Juvenile surivial rate from] Soler, M., J. J. Palomino, J. G. Martinez, and J. J. Soler. 1994. Activity, survival, independence and migration of fledgling Great Spotted Cuckoos. Condor 96:802–805.
Eurasian Coot (*Fulica atra*)	Altricial	0.4–0.74	Short	Brinkhof, M. W. G., A. J. Cavé, S. Daan, and A. C. Perdeck. 2002. Timing of current reproduction directly affects future reproductive output in European Coots. Evolution 56:400–411.
Houbara Bustard (*Chamydotis undulata*)	Precocial	0.87–0.92	Long	[Estimated from Great Bustard because information on adult survival in the Houbara Bustard is lacking.]
Great Bustard (*Otis tarda*)	Precocial	0.87–0.92	Long	Lane, S. J., and J. C. Alonso. 2001. Status and extinction probabilities of Great Bustard (*Otis tarda*) leks in Andalucía, southern Spain. Biodiversity and Conservation 10:893–910.
Short-tailed Shearwater (*Puffinus tenuirostris*)	Semi-precocial	0.93	Long	Bradley, J. S., R. D. Wooller, I. J. Skira, and D. L. Serventy. 1989. Age-dependent survival of breeding Short-tailed Shearwaters *Puffinus tenuirostris*. Journal of Animal Ecology 58:175–188.
Manx Shearwater (*Puffinus puffinus*)	Semi-precocial	0.93–0.96	Long	Lee, D. S., and J. C. Haney. 1996. Manx Shearwater (*Puffinus puffinus*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.

(*continued*)

TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Sooty Shearwater (*Puffinus griseus*)	Semi-precocial	0.93–0.96	Long	Bradley, J. S., R. D. Wooller, I. J. Skira, and D. L. Serventy. 1989. Age-dependent survival of breeding Short-tailed Shearwaters *Puffinus tenuirostris*. Journal of Animal Ecology 58:175–188.
Wandering Albatross (*Diomedea exulans*)	Semi-precocial	0.94–0.95	Long	Weimerskirch, H., N. Brothers, and P. Jouventin. 1997. Population dynamics of Wandering Albatross *Diomedea exulans* and Amsterdam Albatross *D. amsterdamensis* in the Indian Ocean and their relationships with long-line fisheries: Conservation implications. Biological Conservation 79:257–270.
Little Penguin (*Eudyptula minor*)	Semi-precocial	0.78–0.83	Medium	Sidhu, L. A., E. A. Catchpole, and P. Dann. 2007. Mark–recapture–recovery modeling and age-related survival in Little Penguins (*Eudyptula minor*). Auk 124:815–827.
Yellow-eyed Penguin (*Megadyptes antipodes*)	Semi-precocial	0.81–0.85	Medium	Ellenberg, U., A. N. Setiawan, A. Cree, D. M. Houston, and P. J. Seddon. 2007. Elevated hormonal stress response and reduced reproductive output in Yellow-eyed Penguins exposed to unregulated tourism. General and Comparative Endocrinology 152:54–63.
Gentoo Penguin (*Pygoscelis papua*)	Semi-precocial	0.85	Medium	Croxall, J. P., and L. S. Davis. 1999. Penguins: Paradoxes and patterns. Marine Ornithology 27:1–12.
King Penguin (*Aptenodytes patagonicus*)	Semi-precocial	0.92	Long	Croxall, J. P., and L. S. Davis. 1999. Penguins: Paradoxes and patterns. Marine Ornithology 27:1–12.
Wood Stork (*Mycteria americana*)	Altricial	? ~0.80	Short	Coulter, M. C., J. A. Rodgers, J. C. Ogden, and F. C. Depkin. 1999. Wood Stork (*Mycteria americana*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.

(*continued*)

TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Little Egret (*Egretta garzetta*)	Semi-precocial	0.71	Short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
European Shag (*Phalacrocorax aristotelis*)	Altricial	0.88	Long	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Cape Gannet (*Morus capensis*)	Altricial	0.88–0.90	Long	Altwegg, R., R. J. M. Crawford, L. G. Underhill, and A. J. Williams. 2008. Long-term survival of de-oiled Cape Gannets *Morus capensis* after the Castillo de Bellver oil spill of 1983. Biological Conservation 141:1924–1929.
Nazca Booby (*Sula granti*)	Altricial	0.88	Long	T. J. Maness and D. J. Anderson unpubl. data
Herring Gull (*Larus argentatus*)	Semi-precocial	0.90	Long	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Western Gull (*Larus occidentalis*)	Semi-precocial	0.90	Long	Pierotti, R. J., and C. A. Annett. 1995. Western Gull (*Larus occidentalis*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Black-legged Kittiwake (*Rissa tridactyla*)	Semi-precocial	0.94	Long	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Common Tern (*Sterna hirundo*)	Semi-precocial	0.88–0.92	Long	Nisbet, I. C. 2002. Common Tern (*Sterna hirundo*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Sooty Tern (*Onychoprion fuscatus*)	Semi-precocial	0.90	Long	Schreiber, E. A., C. J. Feare, B. A. Harrington, B. G. Murray, Jr., W. B. Robertson, Jr., M. J. Robertson, and G. E. Woolfenden. 2002. Sooty Tern (*Sterna fuscata*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.

(*continued*)

TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Sandwich Tern (*Thalasseus sandvicensis*)	Semi-precocial	0.90	Long	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Black-fronted Tern (*Chlidonias albostriatus*)	Semi-precocial	~0.88	Long	O'Donnell, C. F. J., and J. M. Hoare. 2011. Meta-analysis of status and trends in breeding populations of Black-fronted Terns (*Chlidonias albostriatus*) 1962–2008. New Zealand Journal of Ecology 35:30–43.
Common Guillemot (*Uria aalge*)	Semi-precocial	0.95	Long	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Thick-billed Murre (*Uria lomvia*)	Semi-precocial	0.87–0.90	Long	Gaston, A. J., and J. M. Hipfner. 2000. Thick-billed Murre (*Uria lomvia*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Razorbill (*Alca torda*)	Semi-precocial	0.89–0.96	Long	Lavers, J., M. Hipfner, G. Chapdelaine, and J. M. Hipfner. 2009. Razorbill (*Alca torda*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Ancient Murrelet (*Synthliboramphus antiquus*)	Precocial	0.52–0.77	Short	Gaston, A. J. 1994. Ancient Murrelet (*Synthliboramphus antiquus*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Atlantic Puffin (*Fratecula arctica*)	Semi-precocial	0.92–0.97	Long	Lowther, P. E., A. W. Diamond, S. W. Kress, G. J. Robertson, and K. Russell. 2002. Atlantic Puffin (*Fratercula arctica*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.

(*continued*)

TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Tufted Puffin (*Fratercula cirrhata*)	Semi-precocial	?	Long	Piatt, J. F., and A. S. Kitaysky. 2002. Tufted Puffin (*Fratercula cirrhata*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Great Skua (*Stercorarius skua*)	Semi-precocial	0.89	Long	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Parasitic Jaeger (*Stercorarius parasiticus*)	Semi-precocial	0.80	Medium	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Eurasian Oystercatcher (*Haematopus ostralegus*)	Precocial	0.90	Long	Durell, S. E. L. V., J. D. Goss-Custard, and R. T. C. McGrorty. 2000. Density-dependent mortality in Oystercatchers *Haematopus ostralegus*. Ibis 142:132–138.
Laughing Kookaburra (*Dacelo novaeguineae*)	Altricial	0.89	Long	Legge, S. 2004. Kookaburra: King of the Bush. CSIRO, Victoria, Australia.
Middle Spotted Woodpecker (*Dendrocopus medius*)	Altricial	0.67–0.72	Short	Wiebe, K. L. 2006. A review of adult survival rates in woodpeckers. Annales Zoologici Fennici 43:112–117.
Burrowing Owl (*Athene cunicularia*)	Altricial	0.37–0.58	Very short	Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. Burrowing Owl (*Athene cunicularia*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Tawny Owl (*Strix aluco*)	Altricial	0.74	Short	Francis, C. M., and P. Saurola. 2004. Estimating components of variance in demographic parameters of Tawny Owls, *Strix aluco*. Animal Biodiversity and Conservation 27:489–502.
Eurasian Sparrowhawk (*Accipiter nisus*)	Altricial	0.46–0.76	Short	Newton, I., I. Wyllie, and P. Rothery. 1993. Annual survival of Sparrowhawks *Accipiter nisus* breeding in three areas of Britain. Ibis 135:49–60.

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TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Northern Goshawks (*Accipiter gentilis*)	Altricial	0.68–0.86	Medium	Squires, J. R., and R. T. Reynolds. 1997. Northern Goshawk (*Accipiter gentilis*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Egyptian Vulture (*Neophron percnopterus*)	Altricial	0.90	Long	Donázar, J. A., C. J. Palacios, L. Gangoso, O. Ceballos, M. J. González, and F. Hiraldo. 2002. Conservation status and limiting factors in the endangered population of Egyptian Vulture (*Neophron percnopterus*) in the Canary Islands. Biological Conservation 107:89–97.
Prairie Falcon (*Falco mexicanus*)	Altricial	0.65–0.81	Medium	Steenhof, K. 1998. Prairie Falcon (*Falco mexicanus*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Eastern Kingbird (*Tyrannus tyrannus*)	Altricial	0.62–0.68	Short	Murphy, M. T. 2000. Evolution of clutch size in the Eastern Kingbird: Tests of alternative hypotheses. Ecological Monographs 70:1–20.
Black-crowned Antshrike (*Thamnophilus atrinucha*)	Altricial	0.73–0.75	Short	Brawn, J. D., J. R. Karr, J. D. Nichols, and W. D. Robinson. 1999. Demography of tropical forest birds in Panama: How do transients affect estimates of survival rates? Pages 297–305 *in* Proceedings of the 22nd International Ornithological Congress (N. Adams and R. Slowtow, Eds.). BirdLife South Africa, Johannesburg. Tarwater, C. E., and J. D. Brawn. 2010. The post-fledging period in a tropical bird: Patterns of parental care and survival. Journal of Avian Biology 41: 479–487.
Brown Thornbill (*Acanthiza pusilla*)	Altricial	0.63	Short	Green, D., and A. Cockburn. 1999. Life history and demography of an uncooperative Australian passerine, the Brown Thornbill. Australian Journal of Zoology 47:633–649.

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TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Spotted Antbird (*Hylophylax naevioides*)	Altricial	0.61	Short	Karr, J. R., J. D. Nichols, M. K. Klimkiewicz, and J. D. Brawn. 1990. Survival rates of birds of tropical and temperate forests: Will the dogma survive? American Naturalist 136: 277–291.
Great Tit (*Parus major*)	Altricial	0.56–0.58	Very short	Siriwardena, G.M., S. R. Baillie, and J. D. Wilson. 1998. Variation in the survival rates of some British passerines with respect to their population trends on farmland. Bird Study 45:276–292.
Coal Tit (*Periparus ater*)	Altricial	0.5	Very short	Winkel, W. 1984. Age classes survival rate female Coal Tits *Parus ater*. Vogelwarte 32: 298–302.
Blue Tit (*Cyanistes caeruleus*)	Altricial	0.49	Very short	Dhondt, A. A., B. Kempenaers, and J. Clobert.1998. Sparrowhawk *Accipiter nisus* predation and Blue Tit *Parus caeruleus* adult annual survival rate. Ibis 140:580–584.
Long-tailed Tit (*Aegithalos caudatus*)	Altricial	0.46–0.56	Very short	McGowan, A., B. J. Hatchwell, and R. J. W. Woodburn. 2003. The effect of helping behaviour on the survival of juvenile and adult Long-tailed Tits *Aegithalos caudatus*. Journal of Animal Ecology 72:491–499.
Common House Martin (*Delichon urbica*)	Altricial	0.37	Very short	Robinson, R. A., D. E. Balmer, and J. H. Marchant. 2008. Survival rates of hirundines in relation to British and African rainfall. Ringing & Migration 24:1–6.
Purple Martin (*Progne subis*)	Altricial	0.61	Short	Brown, C. R. 1997. Purple Martin (*Progne subis*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Barn Swallow (*Hirundo rustica*)	Altricial	0.35	Very short	Brown, C. R., and M. B. Brown. 1999. Barn Swallow (*Hirundo rustica*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Tree Swallow (*Tachycineta bicolor*)	Altricial	0.53–0.75	Short	De Steven, D. 1980. Clutch size, breeding success, and parental survival in the Tree Swallow (*Iridoprocne bicolor*). Evolution 34:278–291.

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TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Cliff Swallow (*Petrochelidon pyrrhonota*)	Altricial	0.57	Very short	Brown, C. R., and M. B. Brown. 1995. Cliff Swallow (*Petrochelidon pyrrhonota*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Sociable Weaver (*Philetairus socius*)	Altricial	0.66	Short	Covas, R., C. R. Brown, M. D. Anderson, and M. B. Brown. 2002. Stabilizing selection on body mass in the Sociable Weaver *Philetairus socius.* Proceedings of the Royal Society of London, Series B 269: 1905–1909.
Stitchbird (*Notiomystis cincta*)	Altricial	0.38	Very short	Armstrong, D. P., and J. K. Perrott. 2000. An experiment testing whether condition and survival are limited by food supply in a reintroduced Hihi population. Conservation Biology 14: 1171–1181.
Akepa (*Loxops coccineus*)	Altricial	0.70	Short	[Ralph, C. J., and S. G. Fancy. 1994. Demography and movements of the endangered Akepa and Hawaii Creeper. Wilson Bulletin 106: 615–628.
American Dipper (*Cinclus mexicanus*)	Altricial	0.57	Very short	Gillis, E. A., D. J. Green, H. A. Middleton, and C. A. Morrissey. 2008. Life history correlates of alternative migratory strategies in American Dippers. Ecology 89:1687–1695.
Collared Flycatcher (*Ficedula albicollis*)	Altricial	0.43–0.45	Very short	Gustafsson, L., and W. J. Sutherland. 1988. The costs of reproduction in the Collared Flycatcher *Ficedula albicollis*. Nature 335:813–815.
European Pied Flycatcher (*Ficedula hypoleuca*)	Altricial	0.45–0.5	Very short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Puff-throated Bulbul (*Alophoixus pallidus*)	Altricial	0.84–0.86	Medium	Sankamethawee, W., A. J. Pierce, B. D. Hardesty, and G. A. Gale. 2011. Seasonal variability in survivorship of a cooperatively breeding tropical passerine. Ecological Research 26:429–436.

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TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Ovenbird (*Seiurus aurocapilla*)	Altricial	0.42–0.60	Very short	Porneluzi, P., M. A. Van Horn and T.M. Donovan. 2011. Ovenbird (*Seiurus aurocapilla*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Worm-eating Warbler (*Helmitheros vermivorum*)	Altricial	0.47–0.52	Very short	Hanners, L. A., and S. R. Patton. 1998. Worm-eating Warbler (*Helmitheros vermivorum*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Karoo Scrub Robin (*Cercotrichas coryphaeus*)	Altricial	0.77–0.80	Short	Lloyd, P., W. A. Taylor, M. A. du Plessis, and T. E. Martin. 2009. Females increase reproductive investment in response to helper-mediated improvements in allo-feeding, nest survival, nestling provisioning and post-fledging survival in the Karoo Scrub-Robin *Cercotrichas coryphaeus*. Journal of Avian Biology 40:400–411.
House Sparrow (*Passer domesticus*)	Altricial	0.53–0.68	Short	Ringsby, T. H., B.-E. Sæther, R. Altwegg, and E. J. Solberg. 1999. Temporal and spatial variation in survival rates of a House Sparrow, *Passer domesticus*, metapopulation. Oikos 85:419–425.
Savannah Sparrow (*Passerculus sandwichensis*)	Altricial	0.48–0.78	Short	Perlut, N. G., A. M. Strong, T. M. Donovan, and N. J. Buckley. 2008. Grassland songbird survival and recruitment in agricultural landscapes: Implications for source–sink demography. Ecology 89: 1941–1952.
Song Sparrow (*Melospiza melodia*)	Altricial	0.74–0.77	Short	Arcese, P., J. N. M. Smith, W. M. Hochachka, C. M. Rogers, and D. Ludwig. 1992. Stability, regulation, and the determination of abundance in an insular Song Sparrow population. Ecology 73:805–822.

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TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Lark Bunting (*Calamospiza melanocorys*)	Altricial	0.55–0.65	Short	Yackel Adams, A. A., S. K. Skagen, and J. A. Savidge. 2007. Population-specific demographic estimates provide insights into declines of Lark Buntings (*Calamospiza melanocorys*). Auk 124:578–593.
Dunnock (*Prunella modularis*)	Altricial	0.473	Very short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Yellow-eyed Junco (*Junco phaenotus*)	Altricial	0.69	Short	Sullivan, K. A. 1989. Predation and starvation: Age-specific mortality in juvenile juncos (*Junco phaenotus).* Journal of Animal Ecology 58:275–286.
Cactus Wren (*Campylorhynchus brunneicapillus*)	Altricial	0.50	Very short	Proudfoot, G. A., D. A. Sherry, and S. Johnson. 2000. Cactus Wren (*Campylorhynchus brunneicapillus*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Dickcissel (*Spiza americana*)	Altricial	0.10–0.49	Very short	Sandercock, B. K., E. L. Hewett, and K. L. Kosciuch. 2008. Effects of experimental cowbird removals on brood parasitism and nest predation in a grassland songbird. Auk 125:820–830.
Wood Thrush (*Hylocichla mustelina*)	Altricial	0.36–0.58	Very short	Trine, C. L. 1998. Wood thrush population sinks and implications for the scale of regional conservation strategies. Conservation Biology 12: 576–585.
Eurasian Blackbird (*Turdus merula*)	Altricial	0.60	Short	Miller, M. W., A. Aradis, and G. Landucci. 2003. Effects of fat reserves on annual apparent survival of blackbirds *Turdus merula*. Journal of Animal Ecology 72:127–132.
Red-backed Shrike (*Lanius collurio*)	Altricial	0.53	Very short	Geertsma, M., H. van Berkel, and H. Esselink. 2000. Are high fitness values sufficient to maintain a Dutch population of the Red-backed Shrike (*Lanius collurio*)? Ring 22:79–88.

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TABLE S2. Continued.

Species	Developmental mode	Estimated annual adult survival	Longevity	Reference for survival estimate
Eastern Meadowlark (*Sturnella magna*)	Altricial	0.59–0.61	Short	Kershner, E. L., J. W. Walk, and R. E. Warner. 2004. Breeding-season decisions, renesting, and annual fecundity of female Eastern Meadowlarks (*Sturnella magna*) in southeastern Illinois. Auk 121:796–805.
European Starling (*Sturnus vulgaris*)	Altricial	0.23–0.67	Short	Cabe, P. R. 1993. European Starling (*Sturnus vulgaris*). *In* Birds of North America Online (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, New York. Available at bna.birds.cornell.edu/bna/.
Spotless Starling (*Sturnus unicolor*)	Altricial	?	Very short	Peris, S. J. 1991. Ringing recoveries of the Spotless Starling *Sturnus unicolor* in Spain. Ringing and Migration 12:124–125.
Hooded Crow (*Corvus cornix*)	Altricial	0.5–0.7	Short	Loman, J. 1980. Reproduction in a population of the Hooded Crow *Corvus cornix*. Holarctic Ecology 3:26–35.
Carrion Crow (*Corvus corone*)	Altricial	0.52	Very short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.
Florida Scrub-Jay (*Aphelocoma coerulescens*)	Altricial	0.72–0.80	Short	Breininger, D. R., V. L. Larson, D. M. Oddy, R. B. Smith, and M. J. Barkaszi. 1996. Florida Scrub-Jay demography in different landscapes. Auk 113:617–625.
European Magpie (*Pica pica*)	Altricial	0.6–0.75	Short	Robinson, R. A. 2005. BirdFacts: Profiles of birds occurring in Britain & Ireland. BTO Research Report No. 407. BTO, Thetford, United Kingdom.