

Table A1.1. Individual species results from TITAN from bird surveys conducted in the east-central Alberta (ECAB) study area. Species codes, common names, scientific names, indicator scores (IndVal), change-points (Cp) and percentiles (5%, 50%, 95%), for declining (-) and increasing taxa (+) in response to agricultural conversion at the (A) wetland (500 m) and landscape (B) scales. Note that all significant indicator species are shown but that only species that met significance criteria for $P (\leq 0.05)$, purity (≥ 0.95), and reliability (≥ 0.95 , and ≥ 0.9 for at 0.05, and 0.01, respectively) are included in the figures. P is the probability of getting an equal or larger IndVal using 250 random permutations. IndVal is the unstandardized indicator score, z is the standardized indicator value and N is the frequency of species occurrence among landscapes/wetlands sampled.

A1.1A. Wetland-scale

Code	Common Name	Scientific Name	" +/- "	Cp	5%	50%	95%	z	IndVal	P	Purity	rel05	rel01	N
ALFL	Alder Flycatcher	<i>Empidonax alnorum</i>	-	0.78	0.13	0.60	0.83	2.25	35.89	0.04	0.91	0.84	0.50	41
BOCH	Boreal Chickadee	<i>Poecile hudsonicus</i>	-	0.13	0.03	0.12	0.15	7.22	22.73	0.00	1.00	0.97	0.82	5
BOGU	Bonaparte's Gull	<i>Larus philadelphia</i>	-	0.41	0.03	0.34	0.52	3.72	19.53	0.01	1.00	0.95	0.72	13
CHSP	Chipping Sparrow	<i>Spizella passerina</i>	-	0.65	0.08	0.19	0.73	2.85	28.37	0.02	0.97	0.89	0.54	26
COLO	Common Loon	<i>Gavia immer</i>	-	0.11	0.06	0.12	0.30	8.48	57.83	0.00	1.00	1.00	1.00	29
CONW	Connecticut Warbler	<i>Oporornis agilis</i>	-	0.35	0.15	0.34	0.42	4.18	22.20	0.00	0.93	0.91	0.78	16
GRAJ	Gray Jay	<i>Perisoreus canadensis</i>	-	0.06	0.03	0.07	0.29	6.93	27.03	0.01	1.00	0.94	0.77	6
HETH	Hermit Thrush	<i>Catharus guttatus</i>	-	0.42	0.11	0.37	0.51	6.66	37.58	0.00	1.00	1.00	0.98	27
LCSP	Le Conte's Sparrow	<i>Ammodramus leconteii</i>	-	0.21	0.12	0.27	0.91	3.64	31.04	0.01	0.81	0.76	0.61	29
LISP	Lincoln's Sparrow	<i>Melospiza lincolnii</i>	-	0.58	0.10	0.53	0.83	3.11	41.05	0.02	1.00	0.95	0.72	45
YRWA	Yellow-rumped Warbler	<i>Setophaga coronata</i>	-	0.19	0.05	0.24	0.87	2.92	38.46	0.02	0.88	0.84	0.63	47
NOFL	Northern Flicker	<i>Colaptes auratus</i>	-	0.34	0.09	0.31	0.87	1.97	8.96	0.02	0.77	0.49	0.26	6
OVEN	Ovenbird	<i>Seiurus aurocapillus</i>	-	0.21	0.13	0.27	0.56	7.14	42.53	0.00	1.00	1.00	0.99	28
RBGR	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	-	0.45	0.13	0.42	0.54	4.51	20.63	0.00	1.00	0.97	0.86	13
RCKI	Ruby-crowned Kinglet	<i>Regulus calendula</i>	-	0.47	0.15	0.54	0.76	4.21	30.51	0.00	1.00	1.00	0.83	29
RNDU	Ring-necked Duck	<i>Aythya collaris</i>	-	0.10	0.07	0.35	0.64	3.92	50.11	0.00	1.00	0.99	0.87	42
RNGR	Red-necked Grebe	<i>Podiceps grisegena</i>	-	0.64	0.36	0.62	0.73	5.17	45.77	0.00	0.97	0.97	0.91	40
SACR	Sandhill Crane	<i>Grus canadensis</i>	-	0.11	0.04	0.11	0.30	4.70	20.50	0.00	1.00	0.88	0.67	6
DEJU	Dark-eyed Junco	<i>Junco hyemalis</i>	-	0.34	0.17	0.31	0.47	7.28	40.20	0.00	1.00	1.00	1.00	31
SWSP	Swamp Sparrow	<i>Melospiza georgiana</i>	-	0.10	0.06	0.24	0.64	2.82	35.42	0.03	0.95	0.90	0.66	29
SWTH	Swainson's Thrush	<i>Catharus ustulatus</i>	-	0.30	0.13	0.31	0.47	5.87	27.44	0.00	0.97	0.97	0.95	17
TEWA	Tennessee Warbler	<i>Oreothlypis peregrina</i>	-	0.35	0.12	0.36	0.68	4.73	34.57	0.00	0.95	0.94	0.83	31

WPWA	Palm Warbler White-throated	<i>Setophaga palmarum</i>	-	0.03	0.03	0.20	0.38	4.11	33.22	0.03	0.99	0.92	0.79	11
WTSP	Sparrow Yellow-bellied	<i>Zonotrichia albicollis</i>	-	0.34	0.03	0.34	0.69	5.38	52.71	0.00	0.99	0.99	0.89	63
YBSA	Sapsucker	<i>Sphyrapicus varius</i>	-	0.05	0.03	0.06	0.87	4.32	27.88	0.02	0.86	0.63	0.40	9
AGWT	Green-winged Teal	<i>Anas crecca</i>	+	0.69	0.03	0.54	0.81	2.03	16.37	0.03	0.69	0.55	0.32	10
AMCO	American Coot	<i>Fulica americana</i>	+	0.15	0.12	0.30	0.56	4.90	43.49	0.01	1.00	1.00	0.96	39
AMCR	American Crow	<i>Corvus brachyrhynchos</i>	+	0.89	0.27	0.73	0.91	5.58	65.21	0.01	0.98	0.96	0.79	15
BAOR	Baltimore Oriole	<i>Icterus galbula</i>	+	0.47	0.22	0.50	0.73	4.38	16.97	0.01	1.00	0.94	0.67	9
BBMA	Black-billed Magpie Brown-headed	<i>Pica pica</i>	+	0.67	0.41	0.64	0.87	4.45	21.32	0.00	0.95	0.89	0.75	8
BHCO	Cowbird	<i>Molothrus ater</i>	+	0.14	0.14	0.34	0.83	3.78	25.00	0.00	1.00	1.00	0.79	19
BWTE	Blue-winged Teal	<i>Anas discors</i>	+	0.55	0.22	0.48	0.62	6.34	56.66	0.00	1.00	0.98	0.95	61
CCSP	Clay-colored Sparrow	<i>Spizella pallida</i>	+	0.55	0.12	0.56	0.79	3.80	42.57	0.00	0.99	0.97	0.74	44
EAGR	Eared Grebe	<i>Podiceps nigricollis</i>	+	0.60	0.52	0.62	0.83	4.62	12.00	0.02	0.96	0.74	0.52	3
GADW	Gadwall	<i>Anas strepera</i>	+	0.76	0.03	0.67	0.84	3.47	15.15	0.03	0.67	0.52	0.35	5
HOWR	House Wren	<i>Troglodytes aedon</i>	+	0.55	0.23	0.55	0.83	3.33	13.91	0.01	1.00	0.88	0.56	7
KILL	Killdeer	<i>Charadrius vociferus</i>	+	0.56	0.15	0.54	0.81	4.36	26.27	0.00	0.94	0.91	0.72	18
LEFL	Least Flycatcher	<i>Empidonax minimus</i>	+	0.30	0.06	0.29	0.88	2.32	27.81	0.05	0.79	0.68	0.39	32
MALL	Mallard	<i>Anas platyrhynchos</i>	+	0.14	0.04	0.15	0.86	2.15	39.91	0.04	0.98	0.86	0.46	52
MOWA	Mourning Warbler	<i>Oporornis philadelphia</i>	+	0.73	0.29	0.69	0.91	3.60	17.51	0.02	0.96	0.86	0.55	7
NOPI	Northern Pintail	<i>Anas acuta</i>	+	0.55	0.17	0.54	0.78	2.76	11.24	0.01	0.87	0.51	0.25	6
NSHO	Northern Shoveler	<i>Anas clypeata</i>	+	0.54	0.33	0.52	0.60	7.79	45.82	0.00	1.00	1.00	0.96	27
NSTS	Nelson's Sparrow	<i>Ammodramus nelsoni</i>	+	0.30	0.21	0.31	0.57	2.24	8.77	0.05	0.91	0.43	0.18	5
PBGR	Pied-billed Grebe	<i>Podilymbus podiceps</i>	+	0.51	0.09	0.47	0.91	3.25	25.87	0.01	0.91	0.84	0.58	23
RBNU	Red-breasted Nuthatch	<i>Sitta canadensis</i>	+	0.35	0.14	0.38	0.56	1.61	8.59	0.04	0.80	0.48	0.23	6
REDH	Redhead	<i>Aythya americana</i>	+	0.55	0.17	0.52	0.65	5.91	33.02	0.00	0.99	0.98	0.90	21
REVI	Red-eyed Vireo	<i>Vireo olivaceus</i>	+	0.13	0.11	0.16	0.88	2.06	35.88	0.04	0.73	0.58	0.33	42
RUDU	Ruddy Duck	<i>Oxyura jamaicensis</i>	+	0.36	0.13	0.37	0.52	6.50	38.98	0.00	1.00	1.00	1.00	32
RWBL	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	+	0.38	0.23	0.36	0.43	10.54	67.10	0.00	1.00	1.00	1.00	66
SAVS	Savannah Sparrow	<i>Passerculus sandwichensis</i>	+	0.65	0.25	0.54	0.69	7.96	45.15	0.00	1.00	1.00	1.00	23
SORA	Sora	<i>Porzana carolina</i>	+	0.35	0.07	0.33	0.47	4.64	52.68	0.00	1.00	1.00	0.91	70

SOSA	Solitary Sandpiper	<i>Tringa solitaria</i>	+	0.89	0.21	0.88	0.91	3.84	42.99	0.04	0.88	0.65	0.40	8
SOSP	Song Sparrow	<i>Melospiza melodia</i>	+	0.69	0.21	0.56	0.81	9.35	67.42	0.00	1.00	1.00	1.00	42
VESP	Vesper Sparrow	<i>Poocetes gramineus</i>	+	0.76	0.42	0.67	0.81	10.38	45.70	0.00	1.00	1.00	0.99	13
	Yellow-headed	<i>Xanthocephalus</i>												
YHBL	Blackbird	<i>xanthocephalus</i>	+	0.45	0.42	0.49	0.67	5.88	18.92	0.00	1.00	0.99	0.89	7
YEWA	Yellow Warbler	<i>Setophaga petechia</i>	+	0.30	0.10	0.29	0.57	4.72	42.96	0.00	1.00	0.98	0.86	44

A1.1B. Landscape-scale

Code	Common Name	Scientific Name	Response	Cp	5%	50%	95%	z	IndVal	p	Purity	rel05	rel01	N
BUFF	Bufflehead	<i>Bucephala albeola</i>	-	0.19	0.14	0.51	0.72	2.70	67.50	0.02	0.99	0.96	0.61	17
CHSP	Chipping Sparrow	<i>Spizella passerina</i>	-	0.29	0.19	0.28	0.66	3.17	67.91	0.01	1.00	0.94	0.68	18
COLO	Common Loon	<i>Gavia immer</i>	-	0.51	0.22	0.54	0.72	3.83	68.28	0.00	0.99	0.95	0.75	16
CONW	Connecticut Warbler	<i>Oporornis agilis</i>	-	0.28	0.14	0.28	0.56	2.36	55.44	0.03	0.99	0.92	0.52	13
GRAJ	Gray Jay	<i>Perisoreus canadensis</i>	-	0.28	0.16	0.27	0.53	4.50	59.20	0.00	1.00	0.92	0.69	8
GRYE	Greater Yellowlegs	<i>Tringa melanoleuca</i>	-	0.26	0.14	0.25	0.37	4.17	44.44	0.01	1.00	0.78	0.48	4
HETH	Hermit Thrush	<i>Catharus guttatus</i> <i>Ammodramus</i>	-	0.72	0.16	0.54	0.72	2.37	77.27	0.03	0.87	0.78	0.52	17
LCSP	Le Conte's Sparrow	<i>leconteii</i>	-	0.23	0.14	0.26	0.60	3.18	68.48	0.01	0.94	0.88	0.59	17
LEYE	Lesser Yellowlegs	<i>Tringa flavipes</i>	-	0.16	0.14	0.19	0.70	5.53	81.65	0.00	0.86	0.78	0.61	10
	Yellow-rumped													
YRWA	Warbler	<i>Setophaga coronata</i>	-	0.19	0.14	0.46	0.70	2.06	59.11	0.02	0.89	0.70	0.33	23
NOFL	Northern Flicker	<i>Colaptes auratus</i>	-	0.29	0.14	0.28	0.57	3.42	52.51	0.02	0.91	0.82	0.51	8
OVEN	Ovenbird	<i>Seiurus aurocapillus</i>	-	0.51	0.28	0.51	0.70	5.58	81.66	0.00	1.00	1.00	0.97	16
	Rose-breasted	<i>Pheucticus</i>												
RBGR	Grosbeak	<i>ludovicianus</i>	-	0.46	0.19	0.51	0.70	3.96	66.82	0.00	0.98	0.96	0.84	16
RCKI	Ruby-crowned Kinglet	<i>Regulus calendula</i>	-	0.53	0.16	0.54	0.72	3.65	65.49	0.01	0.96	0.85	0.64	17
RNDU	Ring-necked Duck	<i>Aythya collaris</i>	-	0.72	0.16	0.66	0.72	2.79	70.84	0.01	0.93	0.83	0.58	23
SACR	Sandhill Crane	<i>Grus canadensis</i>	-	0.46	0.26	0.36	0.53	2.32	35.71	0.02	0.89	0.51	0.22	5
DEJU	Dark-eyed Junco	<i>Junco hyemalis</i>	-	0.53	0.29	0.53	0.60	6.39	88.43	0.00	1.00	0.99	0.99	18
SWSP	Swamp Sparrow	<i>Melospiza georgiana</i>	-	0.72	0.14	0.50	0.72	1.65	68.01	0.02	0.78	0.62	0.41	19
SWTH	Swainson's Thrush	<i>Catharus ustulatus</i>	-	0.54	0.29	0.53	0.66	4.52	70.59	0.00	0.98	0.95	0.66	12
TEWA	Tennessee Warbler	<i>Vermivora peregrina</i>	-	0.54	0.23	0.46	0.70	3.85	73.23	0.01	1.00	1.00	0.90	19
WETA	Western Tanager	<i>Piranga ludoviciana</i>	-	0.28	0.16	0.27	0.46	3.00	36.36	0.04	0.98	0.63	0.40	4
PAWA	Palm Warbler	<i>Setophaga palmarum</i>	-	0.51	0.14	0.36	0.66	2.29	49.36	0.03	0.96	0.78	0.45	10

WTSP	White-throated Sparrow	<i>Zonotrichia albicollis</i>	-	0.66	0.16	0.56	0.72	2.08	60.26	0.04	0.82	0.67	0.34	25
AGWT	Green-winged Teal	<i>Anas crecca</i>	+	0.70	0.14	0.53	0.72	2.95	62.51	0.01	0.70	0.62	0.42	8
AMCO	American Coot	<i>Fulica americana</i>	+	0.29	0.25	0.29	0.53	4.93	79.90	0.00	1.00	0.99	0.95	16
AMRO	American Robin	<i>Turdus migratorius</i>	+	0.25	0.14	0.25	0.54	2.44	62.51	0.03	0.86	0.67	0.41	20
BAWW	Black-and-white Warbler	<i>Mniotilta varia</i>	+	0.66	0.16	0.55	0.72	2.08	52.59	0.05	0.78	0.50	0.20	9
BHCO	Brown-headed Cowbird	<i>Molothrus ater</i>	+	0.66	0.25	0.54	0.72	3.62	72.14	0.00	1.00	0.96	0.69	13
BWTE	Blue-winged Teal	<i>Anas discors</i>	+	0.54	0.16	0.36	0.60	2.50	63.41	0.02	0.94	0.79	0.50	20
KILL	Killdeer	<i>Charadrius vociferus</i>	+	0.70	0.16	0.66	0.72	3.72	77.91	0.00	0.84	0.76	0.42	13
LEFL	Least Flycatcher	<i>Empidonax minimus</i>	+	0.29	0.14	0.28	0.60	1.85	58.92	0.04	0.89	0.70	0.34	19
MALL	Mallard	<i>Anas platyrhynchos</i>	+	0.14	0.14	0.14	0.60	3.62	76.20	0.01	0.96	0.87	0.63	22
MAWA	Magnolia Warbler	<i>Setophaga magnolia</i>	+	0.26	0.16	0.27	0.66	3.68	69.53	0.01	0.97	0.88	0.62	14
MOWA	Mourning Warbler	<i>Oporornis philadelphia</i>	+	0.70	0.14	0.66	0.72	3.70	66.00	0.02	0.80	0.67	0.42	6
NOPI	Northern Pintail	<i>Anas acuta</i>	+	0.70	0.28	0.66	0.72	4.67	69.60	0.01	0.94	0.75	0.44	5
NSHO	Northern Shoveler	<i>Anas clypeata</i>	+	0.54	0.28	0.53	0.66	6.95	87.45	0.00	1.00	0.99	0.98	11
RUDU	Ruddy Duck	<i>Oxyura jamaicensis</i>	+	0.51	0.27	0.46	0.56	5.09	75.48	0.00	0.99	0.98	0.87	12
RWBL	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	+	0.25	0.14	0.25	0.29	4.85	72.23	0.00	1.00	1.00	0.96	22
SAVS	Savannah Sparrow	<i>Passerculus sandwichensis</i>	+	0.51	0.28	0.51	0.56	7.54	86.66	0.00	1.00	1.00	0.98	10
SORA	Sora	<i>Porzana carolina</i>	+	0.28	0.19	0.27	0.53	4.03	70.63	0.00	0.99	0.99	0.94	20
SOSP	Song Sparrow	<i>Melospiza melodia</i>	+	0.29	0.16	0.27	0.57	4.79	70.00	0.00	1.00	0.99	0.91	17
VESP	Vesper Sparrow	<i>Pooecetes gramineus</i>	+	0.70	0.54	0.70	0.72	10.00	100.00	0.00	0.96	0.88	0.82	4
YHBL	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	+	0.56	0.29	0.56	0.72	4.38	53.23	0.00	0.99	0.89	0.70	5
YEWA	Yellow Warbler	<i>Setophaga petechia</i>	+	0.25	0.14	0.25	0.36	5.90	79.73	0.00	1.00	1.00	0.97	20