



ALASKA BREEDING BIRD SURVEYS

1984 Summary

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Alaska Department of Fish and Game

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INTRODUCTION

1984 was the third consecutive year that the Nongame Wildlife Program organized Breeding Bird Surveys (BBS) in Alaska. Prior to our involvement, surveys were only done sporadically. In the "Lower 48" states and Canada surveys have been conducted regularly since 1965. All survey information is stored on computer by the U.S. Fish and Wildlife Service at Patuxent Wildlife Research Center, Laurel, Maryland.

The purpose of the surveys is to document changes in the size of bird populations. This can only be accomplished if many surveys are conducted accurately over a wide area of the bird's habitat. Because of Alaska's large size, poor access to remote areas and few numbers of competent observers, the data gathered are less accurate in determining trends in population size.

METHODS

The same standard methods as described in the previous two Alaska Breeding Bird Surveys summaries were used in 1984.

RESULTS

In 1984, 27 BBS routes were completed in Alaska (Table 1) with the help of 47 volunteers (Table 2). Four routes (Petersburg, Juneau-
alt., Harlequin Lake and Lake Louise) had never been done, 22 were repeated from 1983, and one (Homer) was repeated from 1982. Five routes were done more than once either by different observers simultaneously or on different dates, or by the same observer on different dates (Wrangell, Sitka, Kodiak, Moose Pass and Swan Lake Road). Completed surveys included 16 of 25 miles, 1 of 24.5 miles, 1 of 18 miles, 1 of 16 miles, 3 of 15 miles, 1 of 11.5 miles, 1 of 10.5 miles, 2 of 10 miles and 1 of 8.25 miles.

On the 27 routes, 149 species were observed (Table 3). The number of species per route ranged from 18 (Little Salcha) to 47 (Sheep Mt.), and the total number of individuals observed ranged from 109 (Wrangell #1,2) to 831 (Seward).

As in previous years, the American Robin was seen or heard on the most routes - 24 out of 27 (Table 3). The Varied Thrush, however, was the most abundant species (859 individuals tallied from 22 routes).

DISCUSSION

Although we are pleased with the volunteer effort for these surveys, too few have been completed by senior birders for us to analyze any population trends. Each route must be run at least once annually for

about 10 years by competent observers before enough data is collected. Variability in the data due to weather and different observers is a problem for analyzing population trends. Variability in data from the same route taken by different observers or on different dates can be seen from surveys at Wrangell, Sitka, Kodiak, Moose Pass and Swan Lake Road (Table 3).

Suggestions for improvement of the surveys include designing regional field sheets to better reflect the species in each region, and adding more forest habitat categories, especially for logged areas. Several route changes were made or suggested this year to alleviate problems of traffic noise.

Table 1. Alaska Breeding Bird Survey routes and observers, 1984.

Route Name	Route Number	Route Quadrangle	Date of Survey	Route Length (mi)	Observers
Adak	5101	Adak	17 June	24.5	Fred Zeillemaker, Melly Zeillemaker, Sue Steinacher
Craig	5511	Craig	19 June	25	Tom Kogut
Cold Bay	5581	Cold Bay	4 June	15	Christian Dau
Wrangell A	5611	Petersburg	10 & 19 June	10	Kent Russell, Jeff Waters
Petersburg	5612	Petersburg	10 June	25	David Krueper, Nancy Sandburg
Sitka	5724	Sitka	17 June	15	Marjorie Ward, David Krause, Marlys Tedin
Kodiak	5731	Kodiak	11 June	25	Rich MacIntosh, Jeff Allen
Juneau	5821	Juneau	10 June	25	Frank Glass, Mark Kissel
Juneau (alternate)	5822	Juneau	20 June	25	Rich Gordon, Bob Armstrong
Homer	5934	Seldovia	19 June	25	Edgar Bailey, Janet Klein
Anchor River A	5936	Seldovia	11 June	25	Paul Arneson, Scott Chilcutt
Yakutat	5944	Yakutat	16 June	25	Bruce Dinneford, Jack Endicott
Harlequin B Lake	5945	Yakutat	16 June	15	John Galazia, Al May, John Latham
Dillingham	5957	Dillingham	11 June	18	Irma O'Brien, John Wright
Kenai Lake	6028	Seward	10 June	10.5	Paul Arneson
Moose Pass A	6029	Seward	4 & 7 June	25	Betty Bair, Kathy Quilliam, Jerry Bair
Seward	6030	Seward	20 June	25	Rick Sinnott
Skilak Lake	6031	Kenai	15 & 19 June	25	Mary Portner
Swan Lake Road	6033	Kenai	14 June	25	Ted Bailey, Mary Portner
Sheep Mountain	6121	Anchorage	10 June	25	Suzanne Bush, Marvin Breece, John McMillan
Pinnochle	6123	Anchorage	11 June	10	Herman Griese, Linda Griese
Elmendorf	6124	Anchorage	13 June	16	Herman Griese, Linda Griese
Willow	6132	Anchorage	25 June	25	Hustace Scott, Dave Delap
Lake Louise Little	6219	Gulkana	11 June	25	Robert Scher
Salcha A	6428	Big Delta	18 June	25	Jackson Whitman
Kotzebue E	6671	Kotzebue	15 June	8.25	Kent Hall, Beverly Minn
Noatak	6771	Noatak	17 June	11.5	Kent Hall, Beverly Minn

A Survey conducted by "junior" observer

B Survey conducted by "apprentice" observer

C Survey done on foot

D Survey completed after 20 June cut-off

E Survey done in boat

Table 2. Alphabetical listing of volunteer observers for 1984
Breeding Bird Surveys in Alaska.

Allen, Jeff	Krause, David
Armstrong, Bob	Krueper, David
Arneson, Paul	Latham, John
Bailey, Edgar	May, Al
Bailey, Ted	MacIntosh, Rich
Bair, Betty	McMillan, John
Bair, Jerry	Minn, Beverly
Breece, Marvin	O'Brien, Irma
Bush, Suzanne	Portner, Mary
Chilcutt, Scott	Quilliam, Kathy
Dau, Christian	Russell, Kent
Delap, Dave	Sandberg, Nancy
Dinneford, Bruce	Scher, Robert
Endicott, Jack	Scott, Hustace
Galazia, John	Sinnott, Rick
Glass, Frank	Steinacher, Sue
Gordon, Rich	Tedin, Marlys
Griese, Herman	Ward, Marjorie
Griese, Linda	Waters, Jeff
Hall, Kent	Whitman, Jackson
Kerns, Junior	Wright, John
Kissel, Mark	Zeillemaker, Fred
Klein, Janet	Zeillemaker, Melly
Kogut, Tom	

Table 3. Summary of Breeding Bird Surveys conducted in Alaska, 1984. Number represent total numbers of birds seen per route. Replicate surveys are in alphabetical order by observer's last name or in chronological order.

Section A Loon-Scooter	Species	Craig	Wrangeell #1 (Russell 6/10)	Wrangeell #2 (Russell 6/19)	Petersburg	Sitka #1 (Krause 6/12)	Sitka #2 (Ward 6/12)	Juneau	Yakutat J/ Juneau (Alt.)	Harlequin Lake A/ Adak	Gold Bay	Kodiak #1 (Allan 6/11)	Kodiak #2 (McIntosh 6/11)	Dillingham	Homer	Anchorage River	
Red-throated Loon																	
Arctic Loon																	
Common Loon																	
Unid. Loon																	
Red-necked Grebe																	
Horned Grebe																	
Pelagic Cormorant																	
Great Blue Heron	2	2															
Trumpeter Swan																	
Tundra Swan																	
Gr. White-fronted Goose																	
Brant						26	26	1									
Canada Goose	2																
Unid. Goose																	
Green-winged Teal																	
Mallard																	
Northern Pintail																	
Northern Shoveler																	
Gadwall																	
American Wigeon																	
Canvasback																	
Ring-necked Duck																	
Tufted Duck																	
Greater Scaup																	
Lesser Scaup																	
Unid. Scaup																	
Common Eider																	
Harlequin Duck	12	4	3	6													
Oldsquaw																	
Black Scooter																	
Surf Scooter																	
White-winged Scooter																	
Unid. Scooter																	

Table 3. (cont'd)

Section A (cont'd)	Species	No. of Routes*	Total No. Birds**
Kennet Lake	Moose Pass #1 (B. Baier 6/4)		
Kennet Lake	Moose Pass #2 (B. Baier 6/7)		
Seward -/	Seward -/		
Stilts Lake (6/15 and 6/19)	Stilts Lake Rd. #1 (T. Balliey 6/14)		
Swan Lake Rd. #1 (Breece 6/14)	Swan Lake Rd. #2 (T. Balliey 6/14)		
Swan Lake Rd. #3 (MCMillan 6/14)	Swan Lake Rd. #3 (MCMillan 6/14)		
Swan Lake Rd. #4 (Portner 6/14)	Swan Lake Rd. #4 (Portner 6/14)		
Sheep Mt.	Pintochee F/-		
Wallow	Elmendorf		
Lake Louise	Wallow		
Little Satica J/-	Kotzebue		
Nootka	Nootka		
No. of Routes*			
Total No. Birds**			

Table 3. (cont'd)

Section B	Goldeneye - Dunlin	Craig	Rangeell #1	Rangeell #2	Petersburg	Slaska-1	Juneau	Juneau (alt.)	Yakutat	Harrington Lake	Adak	Cold Bay	Kodtak #1	Kodtak #2	Dillingham	Homer	Anchorage River
	Barrow's Goldeneye																
	Bufflehead																
	Common Merganser	3															
	Red-breasted Merganser																
	Unid. Merganser																
	Unid. Duck		1														
	Osprey		1	1													
	Bald Eagle		4	7	4	17	12	19	21	9	2	2	21	1	1	1	
	Northern Harrier																
	Sharp-shinned Hawk																
	Red-tailed Hawk						1		1								
	Golden Eagle																
	American Kestrel																
	Merlin																
	Blue Grouse		4	2	4	7		2		2							
	Willow Ptarmigan												33				
	Rock Ptarmigan												19				
	Sandhill Crane																
	Semipalmated Plover												1	4	1	1	3
	Greater Yellowlegs												11	2	12	2	6
	Lesser Yellowlegs															1	1
	Unid. Yellowlegs													11			
	Solitary Sandpiper																
	Wandering Tattler													2			
	Spotted Sandpiper													1	1		
	Upland Sandpiper																
	Whimbrel																
	Hudsonian Godwit																
	Black Turnstone																
	Semipalmated Sandpiper																
	Least Sandpiper													1	2	1	1
	Rock Sandpiper																69
	Dunlin																

Table 3. (cont'd)

Section B (cont'd)	Species	No. of Routes*	Total No. Birds**
Barrow's Goldeneye		4	5
Bufflehead		2	4
Common Merganser			23
Red-breasted Merganser			
Unid. Merganser			
Unid. Duck			
Osfprey			
Bald Eagle	1	1	1
Northern Harrier			
Sharp-shinned Hawk	1	1	1
Red-tailed Hawk			
Golden Eagle			
American Kestrel			
Merlin		1	1
Blue Grouse			15
Willow Ptarmigan		3	49
Rock Ptarmigan			19
Sandhill Crane	1	1	5
Semipalmated Plover		2	35
Greater Yellowlegs	4	7	12
Lesser Yellowlegs		8	8
Unid. Yellowlegs		8	10
Solitary Sandpiper	1	4	2
Wandering Tattler		1	
Spotted Sandpiper	2	6	3
Upland Sandpiper		2	
Whimbrel			2
Hudsonian Godwit			1
Black Turnstone			1
Semipalmated Sandpiper		13	43
Least Sandpiper	1	1	5
Rock Sandpiper			4
Dunlin			1
			4
			1
			4

Table 3. (cont'd)

Section C	Dowitcher - Flycatcher	Species	Craig	Mrangejell #1	Mrangejell #2	Mrangejell #3	Petersburg	Stikine-1	Stikine-2	Juneau	Juneau (alt.)	Yakutat	Harrington Lake	Adak	Cold Bay	Kodiak #1	Kodiak #2	Dillingham	Homer	Anchorage River	
		Short-billed Dowitcher																			
		Long-billed Dowitcher																			
		Unid. Dowitcher																			
		Common Snipe																			
		Red-necked Phalarope																			
		Unid. Shorebird																			
		Pomarine Jaeger																			
		Parasitic Jaeger																			
		Bonaparte's Gull																			
		New Gull																			
		Herring Gull																			
		Glaucous-winged Gull																			
		Glaucous Gull																			
		Black-legged Kittiwake																			
		Unid. Gull																			
		Arctic Tern																			
		Aleutian Tern																			
		Pigeon Guillemot																			
		Marbled Murrelet																			
		Horned Puffin																			
		Rock Dove																			
		Great-horned Owl																			
		Northern Hawk-Owl																			
		Short-eared Owl																			
		Rufous Hummingbird																			
		Belted Kingfisher																			
		Red-breasted Sapsucker	13		1	38		1	1	12	1										
		Downy Woodpecker																			
		Hairy Woodpecker	4					4	4	3	1										
		Three-toed Woodpecker						1	1	1											
		Northern Flicker						1	1												
		Unid. Woodpecker	3					3	3												
		Olive-sided Flycatcher						1	2												

Table 3. (cont'd)

Section C (cont'd)	Species	Total No. Birds**	No. of Routes*
	<u>Short-billed Dowitcher</u>		
	<u>Long-billed Dowitcher</u>	2	1
	<u>Unid. Dowitcher</u>		2
	<u>Common Snipe</u>	4	2
	<u>Red-necked Phalarope</u>	5	13
	<u>Unid. Shorebird</u>	2	3
	<u>Pomarine Jaeger</u>		1
	<u>Parasitic Jaeger</u>		1
	<u>Bonaparte's Gull</u>	90	1
	<u>Mew Gull</u>	1	2
	<u>Herring Gull</u>	2	4
	<u>Glaucous-winged Gull</u>	7	1
	<u>Glaucous Gull</u>		5
	<u>Black-legged Kittiwake</u>	1	3
	<u>Unid. Gull</u>	4	7
	<u>Arctic Tern</u>	6	3
	<u>Aleutian Tern</u>		2
	<u>Pigeon Guillemot</u>		1
	<u>Marbled Murrelet</u>		1
	<u>Horned Puffin</u>		1
	<u>Rock Dove</u>		1
	<u>Great-horned Owl</u>	1	1
	<u>Northern Hawk-Owl</u>		2
	<u>Short-eared Owl</u>		2
	<u>Rufous Hummingbird</u>		1
	<u>Belted Kingfisher</u>	1	1
	<u>Red-breasted Sapsucker</u>		1
	<u>Downy Woodpecker</u>		1
	<u>Hairy Woodpecker</u>		1
	<u>Three-toed Woodpecker</u>		2
	<u>Northern Flicker</u>	3	1
	<u>Unid. Woodpecker</u>	3	1
	<u>Olive-sided Flycatcher</u>	8	1

Table 3. (cont'd)

Section D	Pewee - Wagtail	Craig	Wrangell #1	Wrangell #2	Wrangell #3	Petersburg	Stikine-1	Stikine-2	Juneau (alt.)	Yakutat	Aldak	Gold Bay	Kodiak #1	Kodiak #2	Dillingham	Homer	Anchorage River
	Western Wood Pewee		1						1							17	15
	Alder Flycatcher																
	Hammond's Flycatcher		1														
	Western Flycatcher	16	58		6	1											
	Unid. Flycatcher		1														
	Tree Swallow	2	4	4	9	11	16	2	2	2	1	1	9	21	1		
	Violet-green Swallow							3	1						1	1	
	Bank Swallow						1										
	Cliff Swallow															19	18
	Barn Swallow	8	3	11	14		11	4	1	2					56	8	26
	Unid. Swallow																2
	Gray Jay																3
	Steller's Jay	8	7	3	29		5	13	2	5					9	5	8
	Black-billed Magpie							16							14	10	12
	Northwestern Crow	2	3	1	2	50	43	66	54	59	1						8
	Common Raven		8	1	5	4	37	22	29	14	13	18	3	2	17	14	8
	Black-capped Chickadee		4		2								4				
	Boreal Chickadee																2
	Chestnut-backed Chickadee	13	2	3	65	114	93	17	1	11							
	Unid. Chickadee																2
	Brown Creeper							1	1	1							
	Winter Wren	102	8	13	8	37	17	15	16	17	2	5	1	12	11		
	American Dipper											1				33	23
	Arctic Warbler															24	
	Golden-crowned Kinglet	20	5	1	12	71	40	42	9	1			3		27	8	9
	Ruby-crowned Kinglet					1	9	6	22	12	14	11			48	48	19
	Gray-cheeked Thrush		1												24	15	20
	Swainson's Thrush	13	2	13	3	21	17	5	7	33							
	Hermit Thrush	40	6	5	9	49	20	12	37	14	111	14					
	American Robin	8	11	10	14	50	31	61	52	34	28	3			8	20	34
	Varied Thrush	58	13	29	7	46	64	26	53	45	94	50	3	2	29	39	71
	Unid. Thrush		1	1													
	Yellow Wagtail																

Table 3. (cont'd)

Species	Section D (cont'd)	Kennal Lake	Moose Pass #1	Moose Pass #2	Seward	Skilak Lake	Swan Lake Rd. #1	Swan Lake Rd. #2	Swan Lake Rd. #3	Swan Lake Rd. #4	Sheep Mt.	Pinechile	Elmendorf	Willow	Lake Louise	Little Salcha	Kotzebue	Noatak	No. of Routes*	Total No. Birds**	
Western Wood Pewee																				6	10
Alder Flycatcher	1	1	7	26	43	53	61	62	4	3	47	89	4	76					3	14	355
Hammond's Flycatcher																				1	1
Western Flycatcher																				4	81
Unid. Flycatcher																				3	6
Tree Swallow	2	14	7	4	19	9	1	9	8			3	4							18	124
Violet-green Swallow			4	2	9					1		1	5	1						9	26
Bank Swallow					1						3		2							9	117
Cliff Swallow			3	7								2	18							5	32
Barn Swallow																				6	43
Unid. Swallow	15	9	4																	5	25
Gray Jay			3	10	3	2	8	1	19	1	1	1	1	8	1					12	74
Steller's Jay																				7	69
Black-billed Magpie		4	1									13	1							8	65
Northwestern Crow																				8	243
Common Raven	1	3	3	7	3	1	1	2	3		1	1	12	26	2					22	228
Black-capped Chickadee		2	2	1	1	1	3	4	1		2	4								9	24
Boreal Chickadee	4	7	1	1	2		2				2	2								6	19
Chestnut-backed Chickadee																				7	224
Unid. Chickadee																				1	2
Brown Creeper																				3	3
Winter Wren																				10	222
American Dipper																				1	1
Arctic Warbler																				4	35
Golden-crowned Kinglet		4	1									2	1							11	164
Ruby-crowned Kinglet	20	38	30	37	15	8	9	15	11	46	6	8	24	20						19	392
Gray-cheeked Thrush			3	32	4		3	4	21	3		6	21	5	2					13	148
Swainson's Thrush	16	15	22	12	73	56	50	82	76	2	61	61	8	10						20	498
Hermit Thrush	17	49	27	97						52	12		2	19						18	635
American Robin	7	13	13	13	9	3	4	11	4	49	8	30	12	43	5	3	4	24	519		
Varied Thrush	30	53	59	119	17	5	8	7	11	1	9	18	3	11					22	859	
Unid. Thrush																			2	2	
Yellow Wagtail																			1	1	

Table 3. (cont'd)

Section E Pipit - Redpoll	Species	Craig	Wrangell #1	Wrangell #2	Petersburg	Sitka-1	Juneau	Yakutat	Harlequin Lake	Adak	Gold Bay	Kodiak #1	Kodiak #2	Dillingham	Homer	Anchorage River
	Water Pipit		1													
	Bohemian Waxwing															
	Northern Shrike															
	European Starling		1	4	1	2										
	Orange-crowned Warbler	9	8	6	4	50	28	12	26	19	2	43	38	41	33	48
	Yellow Warbler					1	3	2	6	2	20	58	59	2	1	3
	Yellow-rumped Warbler					12			1	1				7	3	21
	Townsend's Warbler	38				2	37	5	2	9	3			22	10	8
	Blackpoll Warbler															
	Northern Waterthrush													39	2	8
	Common Yellowthroat					6										
	Wilson's Warbler		1	17	11		8	61	17			91	85	40	28	41
	American Tree Sparrow											18				2
	Chipping Sparrow		3													
	Savannah Sparrow		3	5			16					3	35	36	41	17
	Fox Sparrow	2	1	2	2	13	16	29	15	6	22	1	107	124	31	18
	Song Sparrow			1	4	1	1					6	19			1
	Lincoln's Sparrow	1			10		3	6				11	57	50	33	5
	Golden-crowned Sparrow				2										24	5
	White-crowned Sparrow				1											2
	Dark-eyed Junco	28			18	33	49	3	11	14					3	10
	Unid. Sparrow		4													
	Lapland Longspur													283	48	
	Snow Bunting													4		
	Red-winged Blackbird					1			2							
	Rusty Blackbird														3	
	Rosy Finch											5	1			
	Pine Grosbeak						5	4		1				2		7
	Red Crossbill					38			14	3						
	White-winged Crossbill															
	Unid. Crossbill										2		16			
	Common Redpoll													10	11	58
	Hoary Redpoll													70	42	

Table 3. (cont'd)

Species	Section E (cont'd)	Kennel Lake	Moose Pass #1	Moose Pass #2	Seward	Skilak Lake	Swan Lake Rd. #1	Swan Lake Rd. #2	Swan Lake Rd. #3	Swan Lake Rd. #4	Sheep Mt.	Elmendorf	Willow	Lake Louise	Little Salkha	Kotzebue	Nootka	Total No. Birds**	No. of Routes*	
Water Pipit			2	2					20					1	2			2	13	
Bohemian Waxwing			2					1	1	1								5	27	
Northern Shrike																		1	1	
European Starling																		4	8	
Orange-crowned Warbler	8	67	74	43	12	23	1	27	22	37	2	40	9	1	28			22	588	
Yellow Warbler			1	11	1	2			2	4		2	1	4	2		7	19	132	
Yellow-rumped Warbler	11	41	44	5	42	24	3	13	34	17	2	24	53	7	5			17	289	
Townsend's Warbler	11	25	15	51															10	189
Blackpoll Warbler	2	3	1	6	18	12	6	21	14	15			13	18			1	11	129	
Northern Waterthrush	2	5	11	3	1	16	5	14	14				8	9			1	11	100	
Common Yellowthroat																		1	6	
Wilson's Warbler	10	16	19	15							57	18	2	2	1				18	429
American Tree Sparrow				1							11	48			3			4	7	87
Chipping Sparrow																		1	3	
Savannah Sparrow	2	5	14	16	12	4	4	10	7	9	9	16	4	24			4		20	269
Fox Sparrow	3		13								32	15	18	24			3	8	21	401
Song Sparrow				1	6	8		2	4						1		10	48		
Lincoln's Sparrow	1	1	7	1						3	4	6	15					12	77	
Golden-crowned Sparrow	1	13	14	6			1	4	1	4	2							13	186	
White-crowned Sparrow	1		3	1	43	10	13	25	16	85	32	18	48	63	10	17	12	17	390	
Dark-eyed Junco	8	11	10	5	37	17	5	26	35	60	12	26	52	32	54		21	479		
Unid. Sparrow																		1	4	
Lapland Longspur																2	5	4	338	
Snow Bunting																1	1		4	
Red-winged Blackbird															2		3	5		
Rusty Blackbird	2			1	1	3	2	1	1								6	12		
Rosy Finch																		2	6	
Pine Grosbeak	3	6	2	1			2	1	3	5							9	37		
Red Crossbill																	3	55		
White-winged Crossbill							1	9	4	17	1	57	13	120	8		7	217		
Unid. Crossbill							6		11								3	29		
Common Redpoll	5		81	82	60	80	81	22	2	57	31	33	35				13	529		
Hoary Redpoll																6	2	2	8	

Table 3. (cont'd)

Table 3. (cont'd)

Section F (cont'd)	Species	Kennel Lake	Moose Pass #1	Moose Pass #2	Seward	Skilak Lake	Swan Lake Rd. #1	Swan Lake Rd. #2	Swan Lake Rd. #3	Swan Lake Rd. #4	Piney Mt.	Ptiochle	Elmendorf	Willow	Lake Louise	Little Sajcha	Kotzebue	Noatak	No. of Routes*	Total No. Birds**
Pine Siskin	18	6	214	1	1	1	3	3	5						1				15	492
Unid. Birds	4					2		2											5	13
Total Individuals	174	442	434	831	500	398	272	496	486	666	332	454	657	429	300	253	320			
Total Species	26	27	33	40	36	36	33	37	37	47	35	39	45	46	18	26	40	149/27	13,480	

- * Duplicate routes not included in total
- ** When duplicate surveys were done, maximum number was included in total birds.

A/ survey done by apprentice observer
J/ survey done by junior observer
F/ survey done on foot