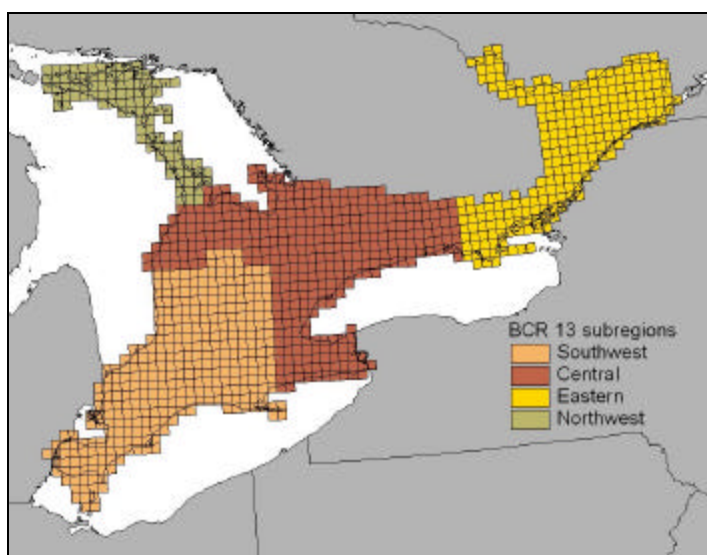


BACKGROUND TO POPULATION OBJECTIVES

BCR 13 Subregions – for setting Population Distribution objectives:

BCR 13 was divided into four subregions (SW, Central, East, NW) to assess distribution across the BCR. Subregions were based largely on Atlas administrative regions:

- SouthWest – Atlas regions 1-7, 47
- Central – Atlas regions 8 (S of 44.6°), 9-17, 45, 46
- East – Atlas regions 20-26 (excluding squares in BCR 12)
- NorthWest – Atlas regions 33 (Manitoulin) & 8 (N of 44.6° - Bruce Pen.)



These 4 subregions differ in habitat cover, particularly in the amount of crop vs. forest cover in the landscape ("sparse" = partial canopy cover; "fields" includes pastures, abandoned fields and alvars):

General Land Cover	BCR 13 subregions				Total BCR 13
	Southwest	Central	Eastern	Northwest	
Marsh	1%	<1%	2%	2%	1%
Swamp	1%	4%	7%	2%	3%
Dense Forest	12%	25%	32%	52%	23%
Sparse Forest	1%	3%	3%	20%	3%
Fields	2%	13%	22%	18%	12%
Crops	81%	50%	32%	3%	54%
Urban	2%	5%	2%	<1%	3%

Type of Forest Cover	BCR 13 subregions				Total BCR 13
	Southwest	Central	Eastern	Northwest	
Deciduous	80%	58%	60%	32%	59%
Mixed	12%	20%	25%	40%	23%
Coniferous	8%	22%	15%	27%	18%

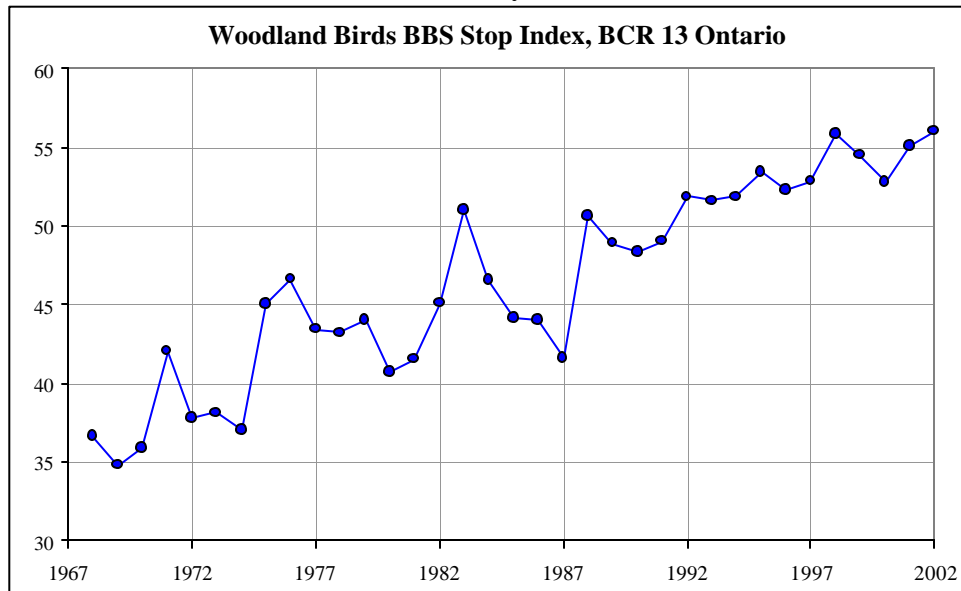
FOREST BIRDS:

Forest birds have been increasing in numbers over the past 35 years in southern Ontario (i.e. in BCR 13 in Ontario), according to BBS data:

BBS Trends for Forest Bird Guild 1967-2002, BCR 13 Ontario

Total BBS Stops: +1.2 % / year, 62 routes, $P < 0.05$

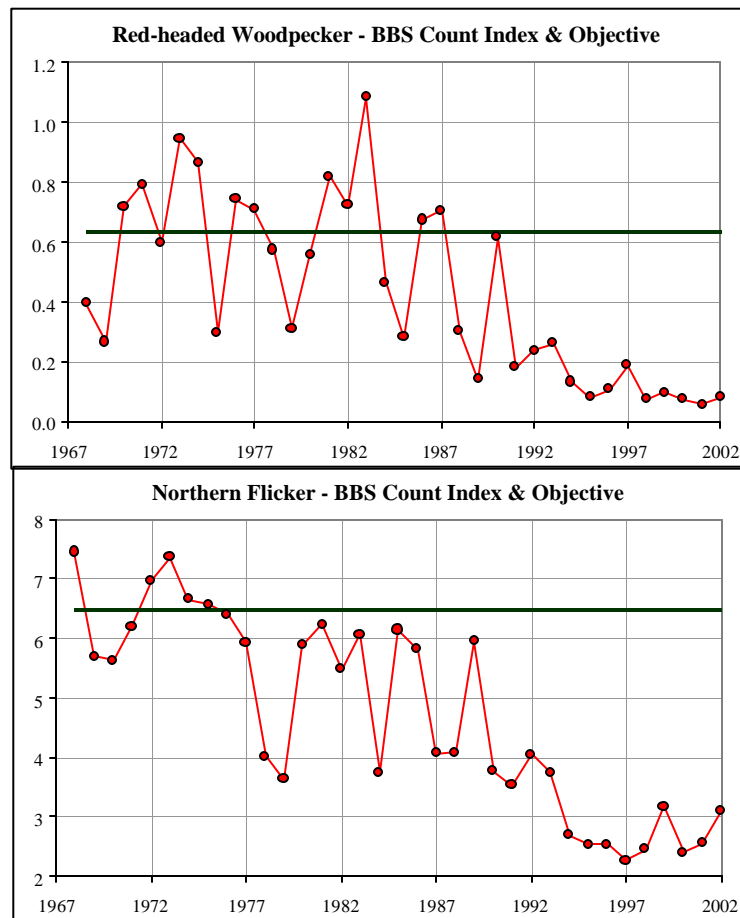
Total Abundance: +1.5 % / year, 62 routes, $P < 0.05$



Among individual forest species showing significant population trends, increases have outnumbered declines. Declining species rely on a mix of forest & open habitat:

Species	N	Trend (%/yr)	Sig	P
Magnolia Warbler	27	10.2	*	0.000
Black-and-white Warbler	46	5.6	*	0.014
Hermit Thrush	29	5.4	*	0.029
Black-capped Chickadee	59	5.3	*	0.000
Nashville Warbler	41	4.5	*	0.023
Ruby-throated Hummingbird	51	3.9	*	0.005
Ovenbird	59	3.8	*	0.001
Cedar Waxwing	62	3.3	*	0.000
Red-eyed Vireo	61	3.0	*	0.002
Warbling Vireo	61	2.9	*	0.000
Least Flycatcher	60	2.5	*	0.047
White-breasted Nuthatch	58	2.3	n	0.064
Black-billed Cuckoo	59	-2.1	*	0.040
Great Horned Owl	36	-2.9	*	0.037
Northern Flicker	61	-3.1	*	0.000
Yellow-billed Cuckoo	44	-4.7	*	0.004
Red-headed Woodpecker	35	-6.5	*	0.000

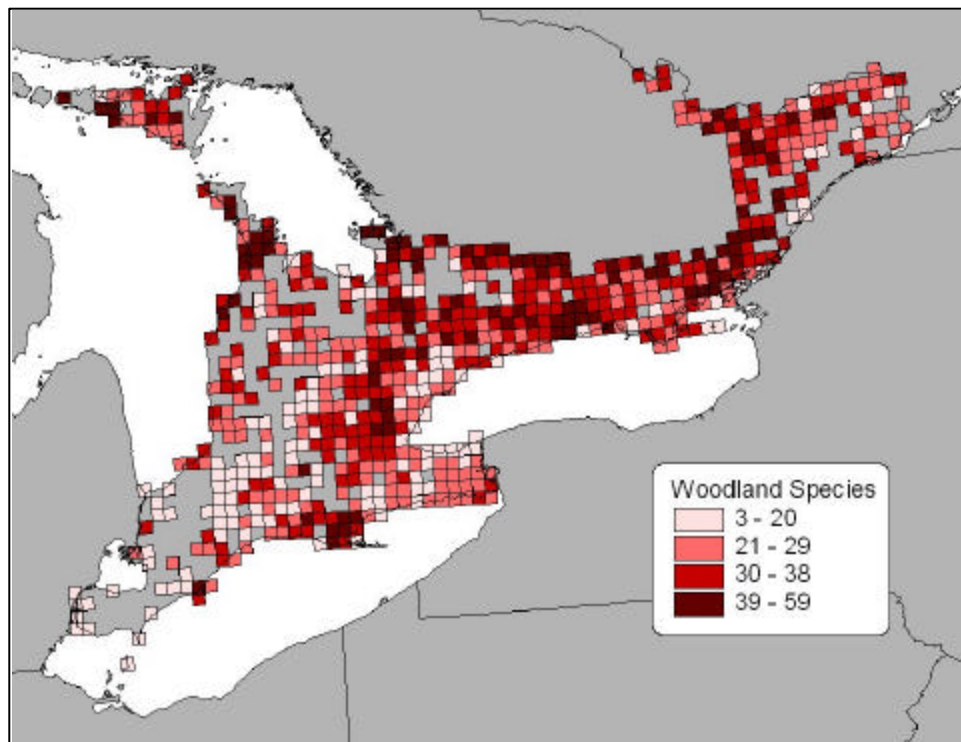
BBS annual indices provide a way to show the magnitude of declines, and monitor progress towards reversing declines (objectives for priority forest species are based on returning to average populations during 1968-77, e.g., green line in graphs below).



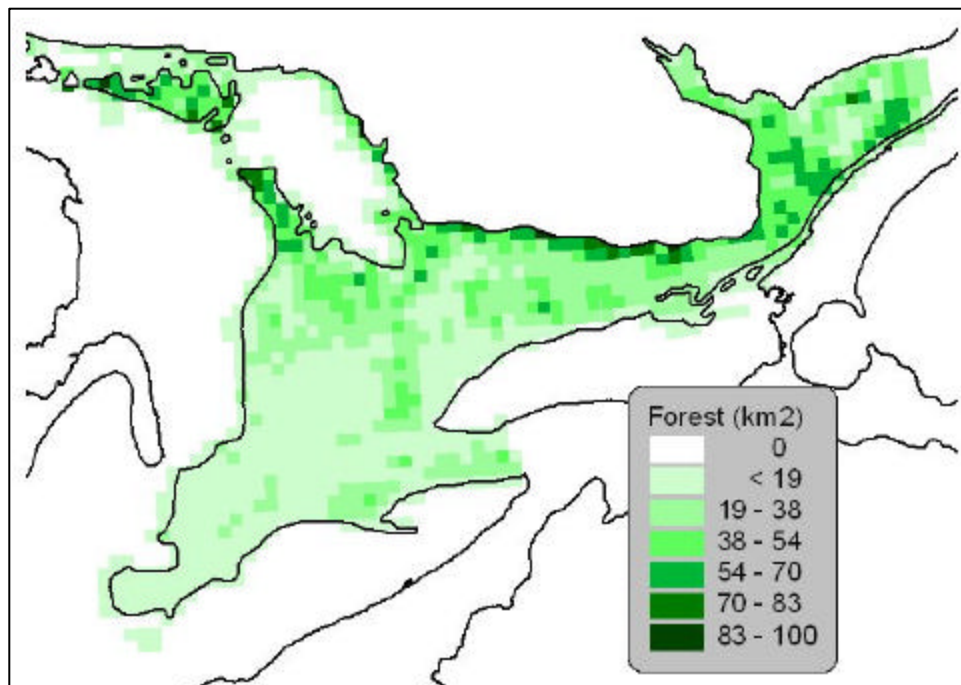
Rough population estimates are derived directly from the BBS count indices. They give perspective on the magnitude of actions required to reverse declines, and an idea of the amount of habitat necessary to maintain priority species (bold = significant trends).

Species	BCR 13 Trend (% / yr)	BCR 13 Ontario Trend	BBS Index 1968-77	BBS Index 2001-02	BBS Index Change	Est. Pop'n 1968-77	Est. Pop'n Change to 2001-02
Black-billed Cuckoo	-2.3	-2.1	1.4	0.9	-33%	63,000	-21,000
Red-headed Woodpecker	-6.0	-6.5	0.63	0.07	-89%	24,000	-22,000
Northern Flicker	-3.2	-3.1	6.5	2.8	-56%	240,000	-130,000
Veery	-0.5	0.0	3.3	3.0	-8%	180,000	-13,000
Wood Thrush	-1.0	1.0	2.4	2.8	+16%	150,000	24,000
Canada Warbler	-4.7	-0.1	0.11	0.10	-6%	3,500	-200
Rose-breasted Grosbeak	0.3	-1.0	4.8	3.5	-26%	140,000	-37,000

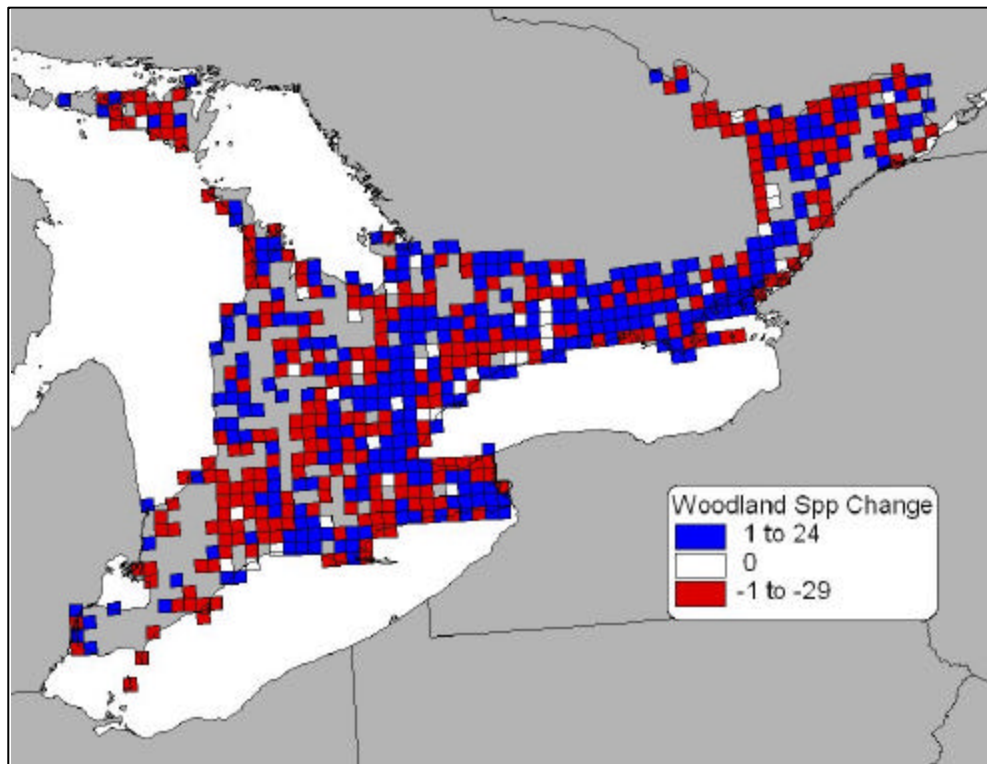
Distribution of forest birds in BCR 13, from the current Breeding Bird Atlas (squares with ≥ 20 hours of effort in 2001-03).



The pattern above roughly mirrors the amount of forest habitat across BCR 13:



Distribution of increases and declines in forest species, comparing current Atlas (2001-03) vs. 1981-85 Atlas (squares with ≥ 20 hours of effort in both atlases). Shows broad areas with increasing species richness, but also areas with declines to date:



Overall there has been a non-significant increase in number of forest bird species, with a significant increase in the central subregion:

Forest Species per Atlas square with 20+ hours of effort:
 1981-85: 28.1 2001-03: 28.8 Change: +0.7

Guild	Change in Species per square, 2001-03 vs 1981-85				
	BCR 13	SW	CE	EA	NW
Forest Birds	2%	-1%	4%	2%	-2%

Atlas changes in priority forest bird species. Several species are so far showing losses. These tend to be consistent across subregions (bold = significant ($P < 0.05$) change, +/- = direction of non-significant changes)

Forest Species	Atlas Squares 2001-03	Expected per 1st Atlas	Difference BCR 13	Diff. SWest	Diff. Central	Diff. East	Diff. NWest
Hooded Warbler	59	14	45	15	29	+	
Acadian Flycatcher	29	23	6	+	+		
Bay-breasted Warbler	9	6	+	-	5	+	-
Prothonotary Warbler	15	12	+	+	+		-
Rusty Blackbird	8	6	+	+	+	+	-
Black-billed Cuckoo	502+	536	-?	-?	+	-?	+
Kirtland's Warbler	0	1	-		-		
Northern Flicker	707	710	-	-	-	-	+
Louisiana Waterthrush	21	27	-	-	-	+	
Rose-breasted Grosbeak	679	687	-	+	-	-	-6
Red-shouldered Hawk	146	159	-	-	-	-	-
Wood Thrush	633	653	-20	-	-	-12	+
Cerulean Warbler	40	61	-21	-	-11	-	-
Canada Warbler	179	229	-50	-	-	-21	-
Long-eared Owl	54	112	-58	-	-18	-37	-
Veery	555	636	-81	-43	-32	-	-6
Northern Saw-whet Owl	66	155	-89	-7	-29	-60	-
Red-headed Woodpecker	184	507	-323	-127	-132	-45	-13

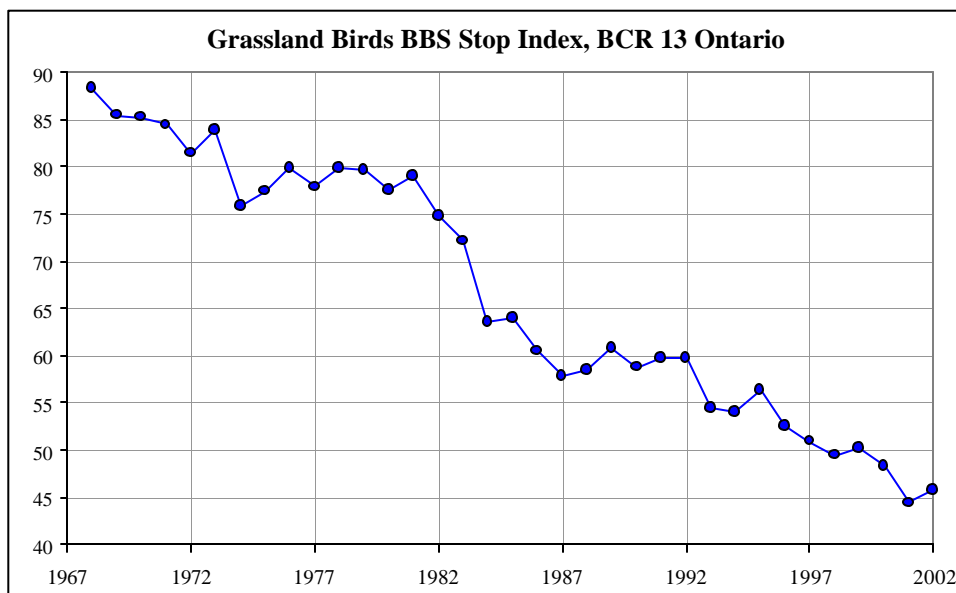
GRASSLAND BIRDS:

Grassland birds have decreased substantially in numbers over the past 35 years in southern Ontario (BCR 13), according to BBS data:

BBS Trends for Grassland Bird Guild 1967-2002, BCR 13 Ontario

Total BBS Stops: -2.0 % / year, 62 routes, $P < 0.001$

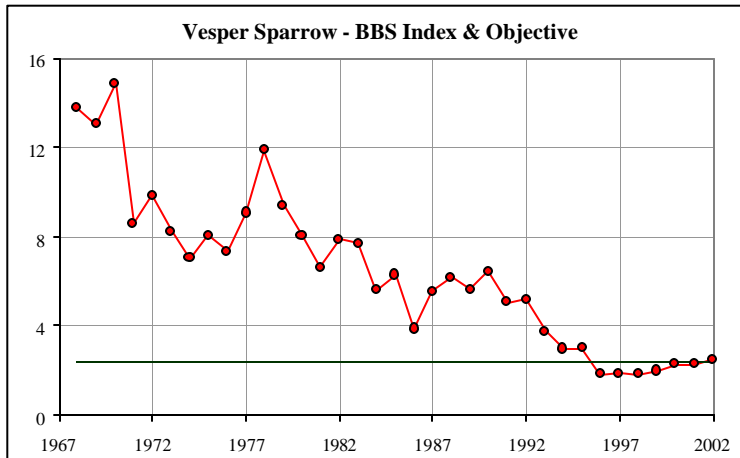
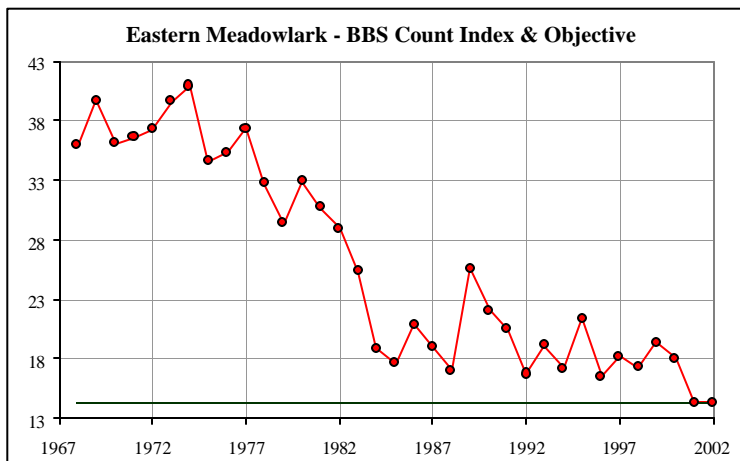
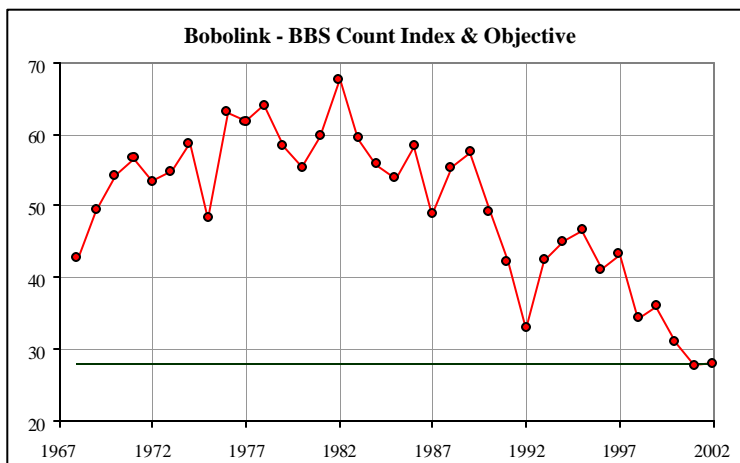
Total Abundance: -2.2 % / year, 62 routes, $P < 0.001$

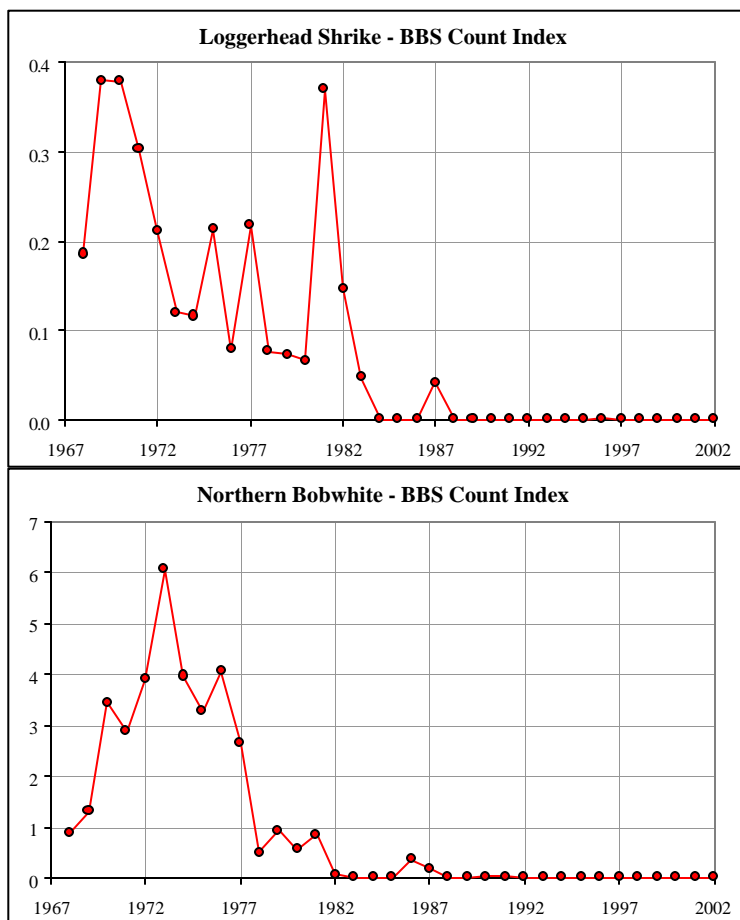


Among grassland species, significant long-term BBS trends have all been negative:

Species	N	Trend (%/yr)	Sig	P
Killdeer	62	-0.9	*	0.001
Bobolink	62	-1.6	*	0.003
Savannah Sparrow	62	-2.2	*	0.000
Brown-headed Cowbird	62	-2.4	*	0.000
Eastern Meadowlark	61	-3.0	*	0.000
Upland Sandpiper	54	-4.8	*	0.010
Vesper Sparrow	62	-5.4	*	0.000
Ring-necked Pheasant	41	-7.0	*	0.010
Western Meadowlark	22	-7.4	*	0.007
Loggerhead Shrike	18	-19.0	*	0.033
Northern Bobwhite	6	-23.2	*	0.014

BBS annual indices for five grassland priority species show the nature of the declines (horizontal line show an objective based on maintaining current (2001-02) population):

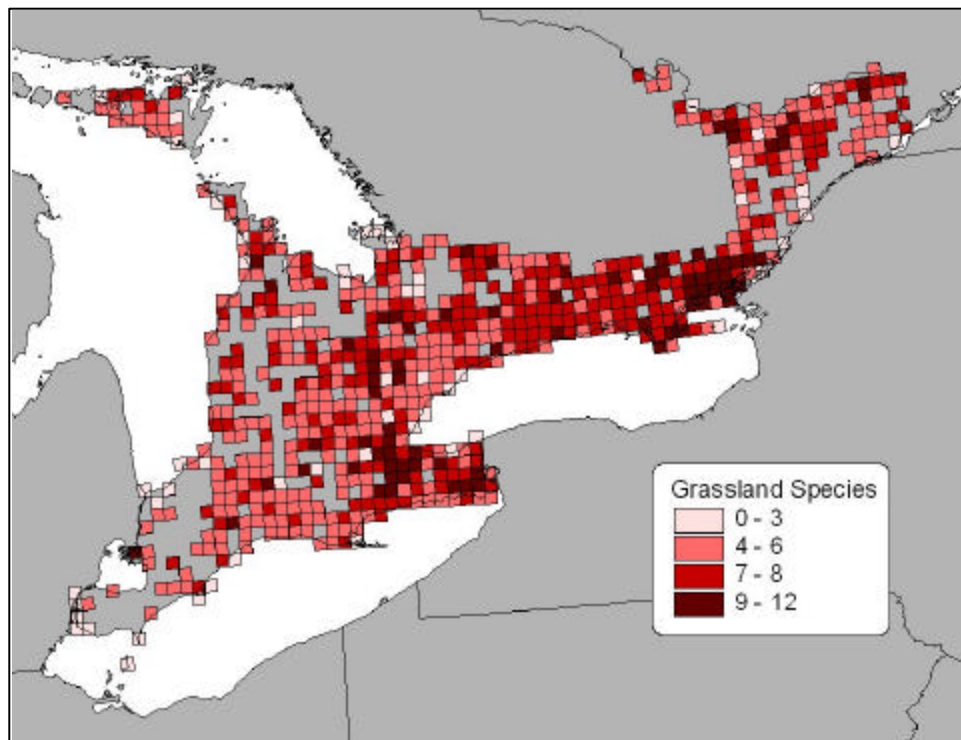




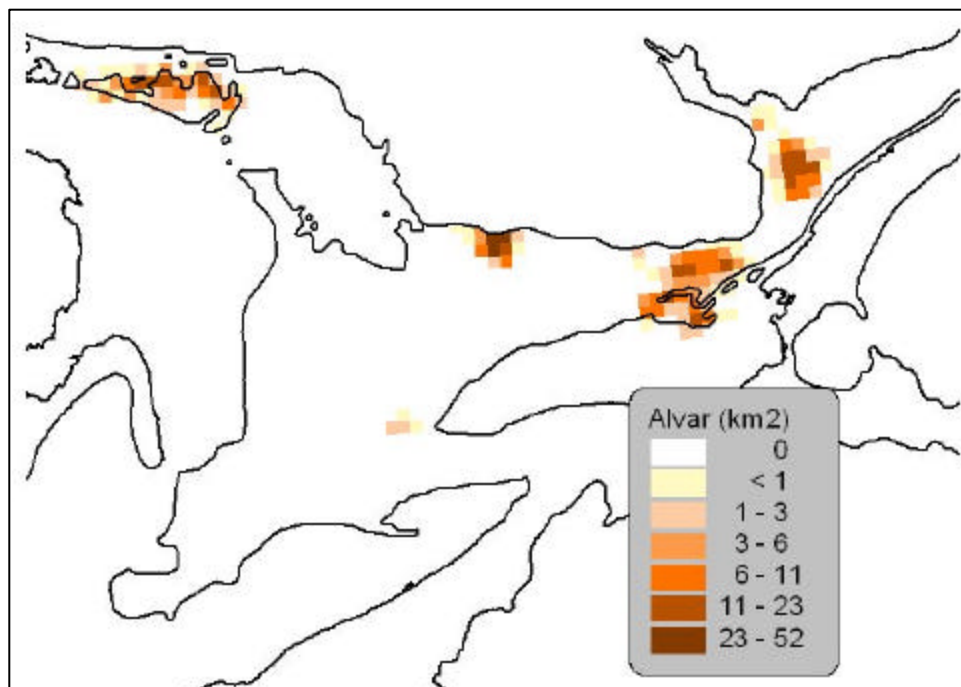
BBS Indices and estimated population sizes for priority grassland species (bold = significant trends; priority species without enough data for BBS trends are excluded).

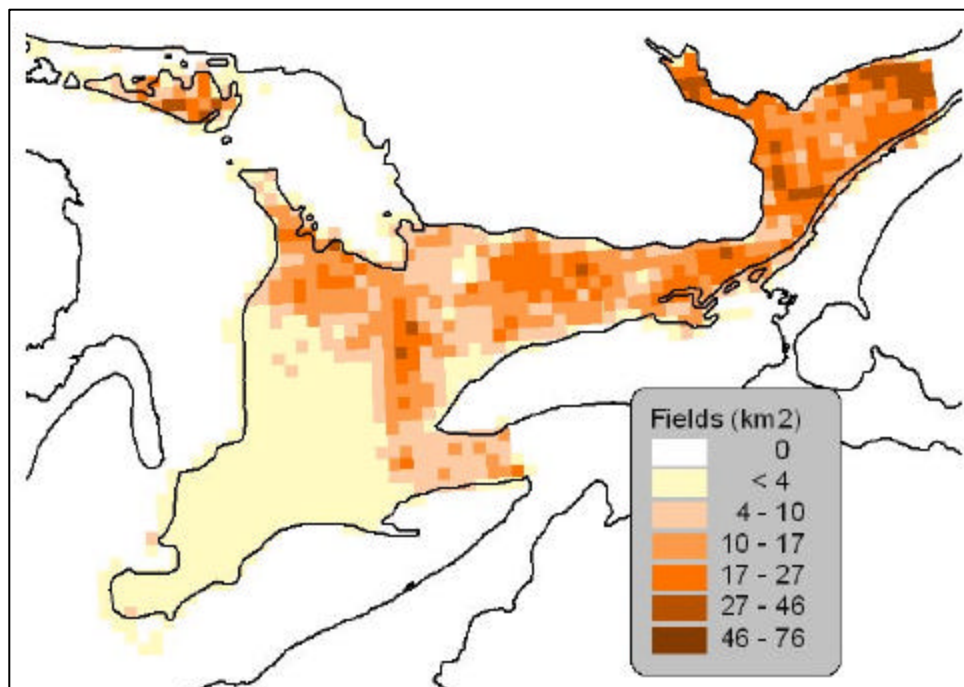
Species	BCR 13 Trend (% / yr)	BCR 13 Ontario Trend	BBS Index 1968-77	BBS Index 2001-02	BBS Index Change	Est. Pop'n 1968-77	Est. Pop'n Change to 2001-02
Northern Bobwhite	-15.7	-23.2	3.2	0	-100%		
Loggerhead Shrike	-22.6	-19.0	0.23	0.00	-100%		
Vesper Sparrow	-3.6	-5.4	10.0	2.4	-76%	400,000	-300,000
Grasshopper Sparrow	-8.4	-2.3	1.5	0.9	-42%	57,000	-25,000
Henslow's Sparrow	-8.9						
Bobolink	-0.9	-1.6	54.3	27.9	-49%	2,100,000	-1,000,000
Eastern Meadowlark	-3.4	-3.0	37.4	14.3	-62%	330,000	-200,000

Distribution of grassland bird species in BCR 13, from the current Breeding Bird Atlas (squares with ≥ 20 hours of effort in 2001-03).

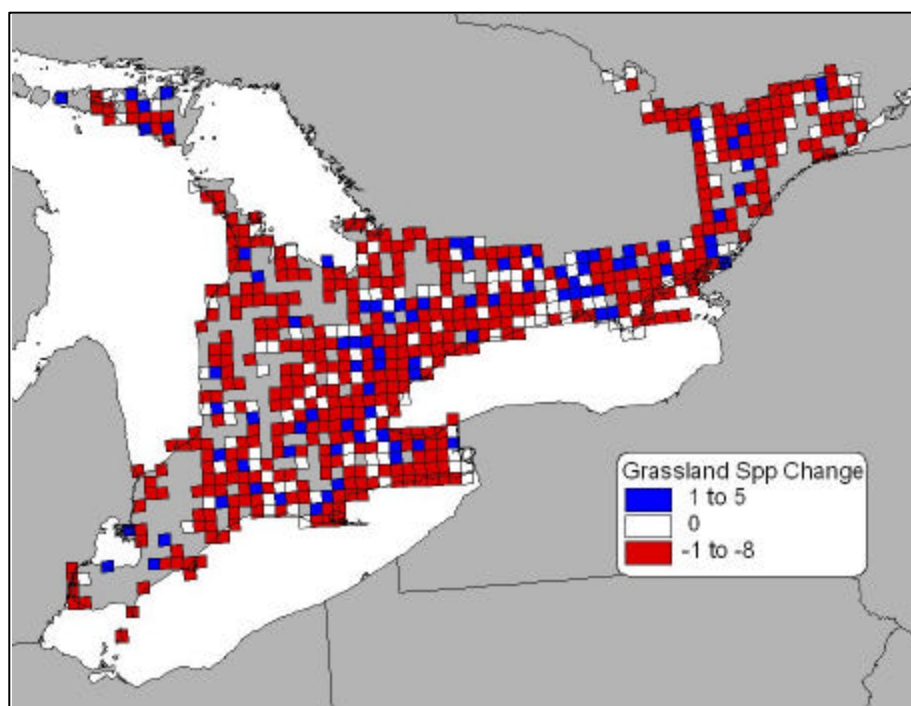


The pattern above loosely reflects the amount of alvar and fields/pasture habitat across the region (2 maps below):





Distribution of increases and declines, based on comparison of current Atlas to date vs. 1981-85 Atlas (squares with ≥ 20 hours of effort in both atlases). Shows reduced numbers of grassland bird species in most parts of BCR 13:



Overall there has been a significant decrease in number of grassland bird species, with significant decreases in all subregions:

Grassland Species per Atlas square with 20+ hours of effort:
 1981-85: 7.4 2001-03: 6.1 Change: -1.3

Guild	Change in Species per square, 2001-03 vs 1981-85				
	BCR 13	SW	CE	EA	NW
Grassland Birds	-18%	-22%	-17%	-17%	-12%

Atlas changes in priority grassland bird species. All species, and all atlas subregions, are so far showing losses (bold = significant ($P < 0.05$) change, +/- = direction of non-significant changes)

Grassland Species	Atlas Squares 2001-03	Expected per 1st Atlas	Difference BCR 13	Diff. SWest	Diff. Central	Diff. East	Diff. NWest
Short-eared Owl	36	39	-	-5	+	-	-
Barn Owl	1	5	-4	-	-	-	-
Henslow's Sparrow	6	30	-24	-4	-	-15	-
Bobolink	666	694	-28	-15	-10	-	-
Northern Bobwhite	22	56	-34	-30	-	+	-
Eastern Meadowlark	657	694	-37	-22	-11	-	-
Grasshopper Sparrow	268	322	-54	-27	-25	-	+
Loggerhead Shrike	27	93	-66	-4	-30	-32	-4
Vesper Sparrow	496	652	-156	-38	-63	-45	-10

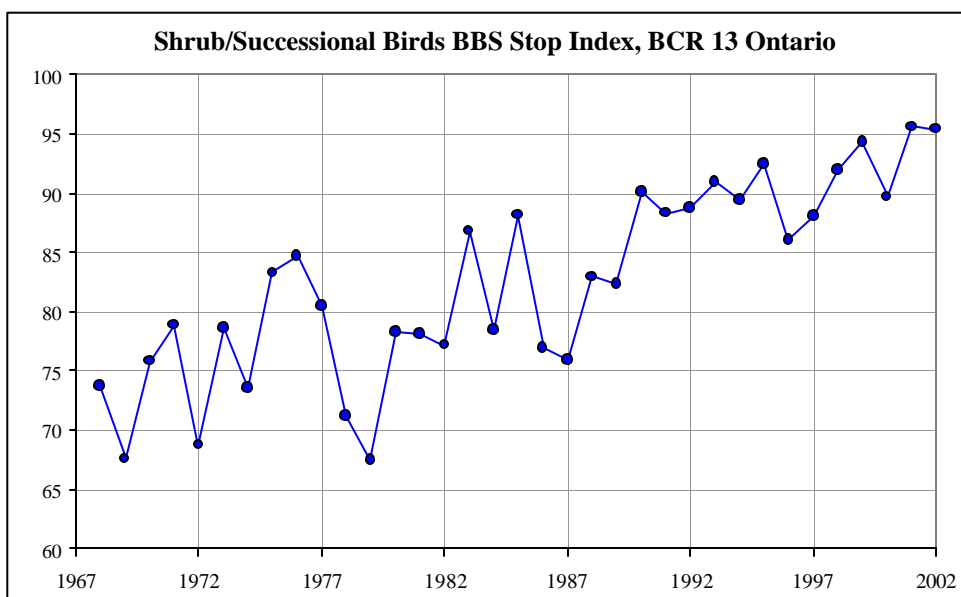
SHRUB / SUCCESSIONAL BIRDS:

As a group, birds of shrub and successional habitats have been increasing in numbers over the past 35 years in southern Ontario, according to BBS data:

BBS Trends for Shrub / Successional Bird Guild 1967-2002, BCR 13 Ontario

Total BBS Stops: +0.8 % / year, 62 routes, $P < 0.01$

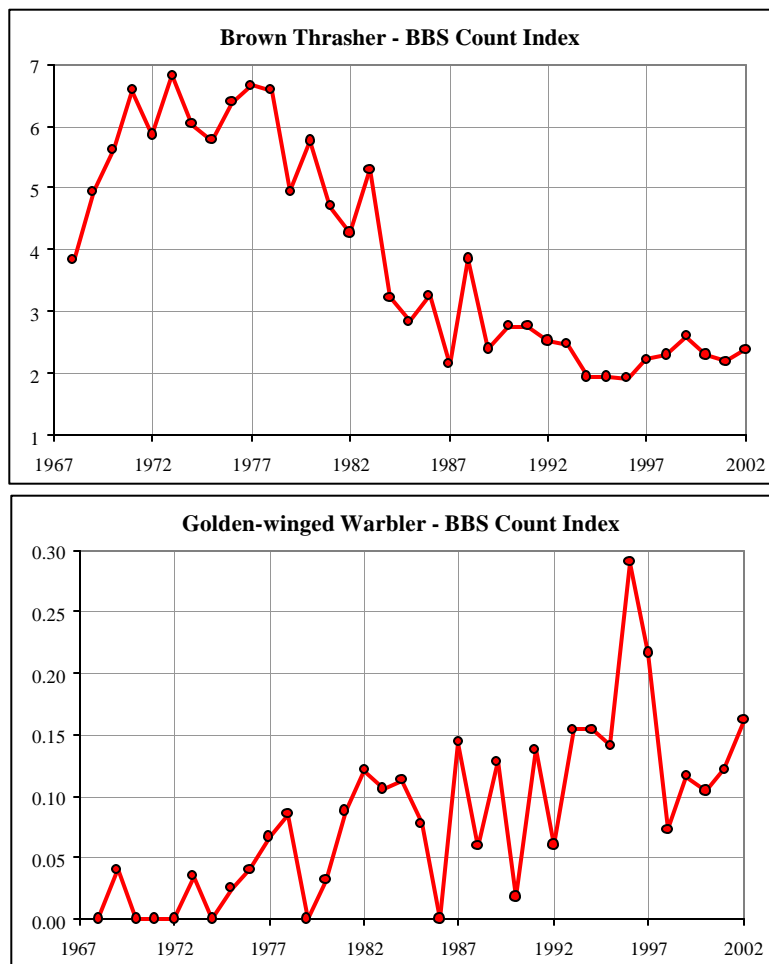
Total Abundance: +0.7 % / year, 62 routes, $P < 0.05$



Among individual shrub / successional species showing significant ($P < 0.10$) population trends, changes have been largely positive over the same period. Only Brown Thrasher has exhibited a significant population decline, though Vesper Sparrow has also declined (see grassland data), as has Black-billed Cuckoo (see forest species):

Species	N	Trend (%/yr)	Sig	P
Alder Flycatcher	57	4.4	*	0.001
Chestnut-sided Warbler	50	4.2	*	0.024
Willow Flycatcher	45	3.8	*	0.014
Northern Cardinal	58	3.2	*	0.006
Yellow Warbler	62	2.8	*	0.001
Common Yellowthroat	61	2.1	*	0.000
American Goldfinch	62	0.7	n	0.088
Brown Thrasher	59	-3.7	*	0.000

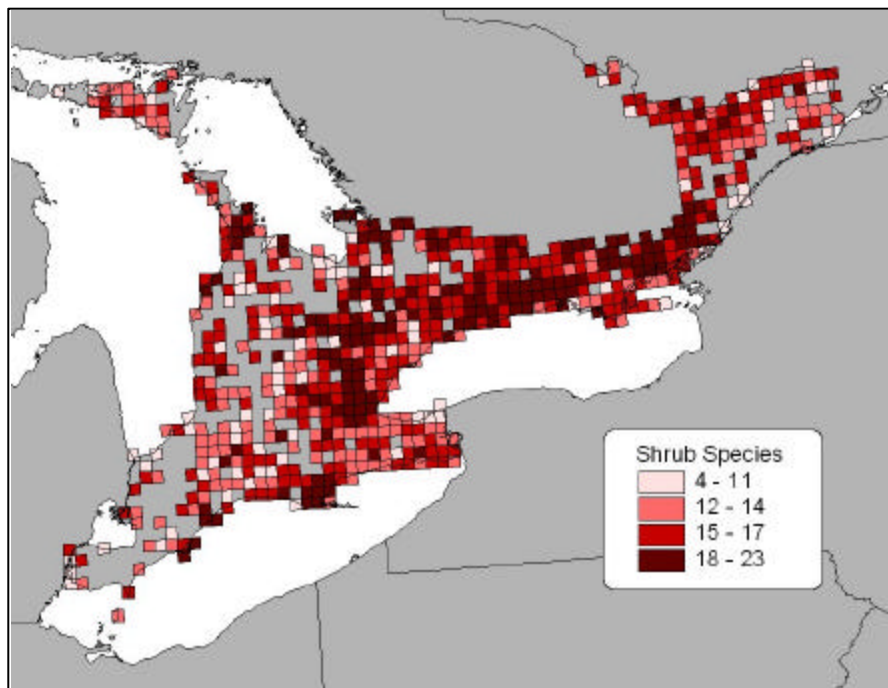
BBS annual indices for selected priority species:



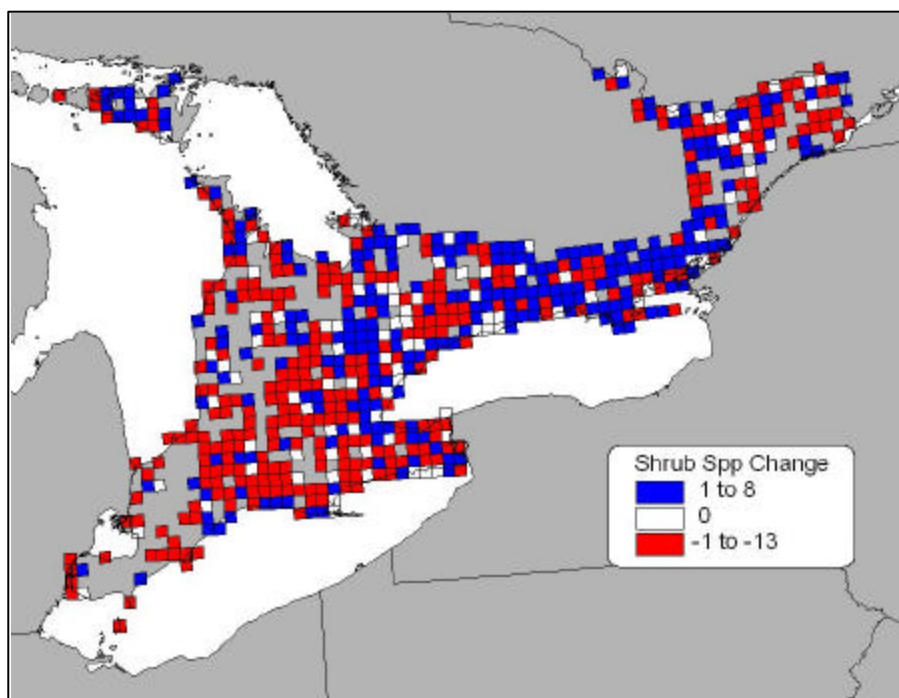
BBS Indices and estimated population sizes for priority shrub / successional species (bold = significant trends; see grassland for Vesper Sparrow, forest for Black-billed Cuckoo).

Species	BCR 13 Trend (% / yr)	BCR 13 Ontario Trend	BBS Index 1968-77	BBS Index 2001-02	BBS Index Change	Est. Pop'n 1968 77	Est. Pop'n Change to 2001-02
Willow Flycatcher	1.3	3.8	0.85	1.8	110%	25,000	28,000
Whip-poor-will	-9.3	-4.5	0.18	0.02	-88%	23,000	-20,000
Brown Thrasher	-3.6	-3.7	5.8	2.3	-61%	200,000	-120,000
Blue-winged Warbler	-0.9	0.8	0	0.07	+	0	2,100
Golden-winged Warbler	-2.1	4.5	0.02	0.14	+582%	800	4,400
Eastern Towhee	-5.2	-1.3	0.94	0.76	-19%	32,000	-6,000
Field Sparrow	-3.6	-0.1	2.9	2.4	-17%	79,000	-14,000

Distribution of shrub / successional birds in BCR 13, from the current Breeding Bird Atlas (squares with ≥ 20 hours of effort in 2001-03).



Distribution of increases and declines in shrub / successional species, comparing current Atlas (2001-03) vs. 1981-85 Atlas (squares with ≥ 20 hours of effort in both atlases). Shows more decreases in the SW than elsewhere:



Overall there has been a small but significant decrease in number of shrub / successional bird species, largely due to a decrease in the southwestern part of BCR 13:

Shrub / Successional Species per Atlas square with 20+ hours of effort:
 1981-85: 15.5 2001-03: 15.1 Change: -0.4

Guild	Change in Species per square, 2001-03 vs 1981-85				
	BCR 13	SW	CE	EA	NW
Shrub / Successional	-3%	-9%	0%	-1%	4%

Atlas changes in priority shrub / successional bird species. Note that there were 50 atlas squares in 2001-03 with Blue-winged or Golden-winged Warblers, not identified to species, hence the plus (+) signs for those species – i.e., changes may be more positive than numbers indicate. Regardless, a shift in distribution is apparent in these two species. (bold = significant change, +/- = direction of non-significant changes).

Shrub / Succ. Species	Atlas Squares 2001-03	Expected per 1st Atlas	Difference BCR 13	Diff. SWest	Diff. Central	Diff. East	Diff. NWest
Blue-winged Warbler	141+	101	40+	-5+	46+	2+	-1+
Prairie Warbler	8	10	-	-	+	-	-
Willow Flycatcher	482	493	-	-26	-	-	-
Yellow-breasted Chat	10	34	-24	-12	-9	-	-
Golden-winged Warbler	109+	155	-46+	-34+	-15+	12+	-9+
Field Sparrow	545	597	-52	-29	+	-23	-
Eastern Towhee	411	480	-69	-29	-30	-	-
Brown Thrasher	624	700	-76	-36	-27	-16	+
Whip-poor-will	161	298	-137	-21	-63	-40	-16

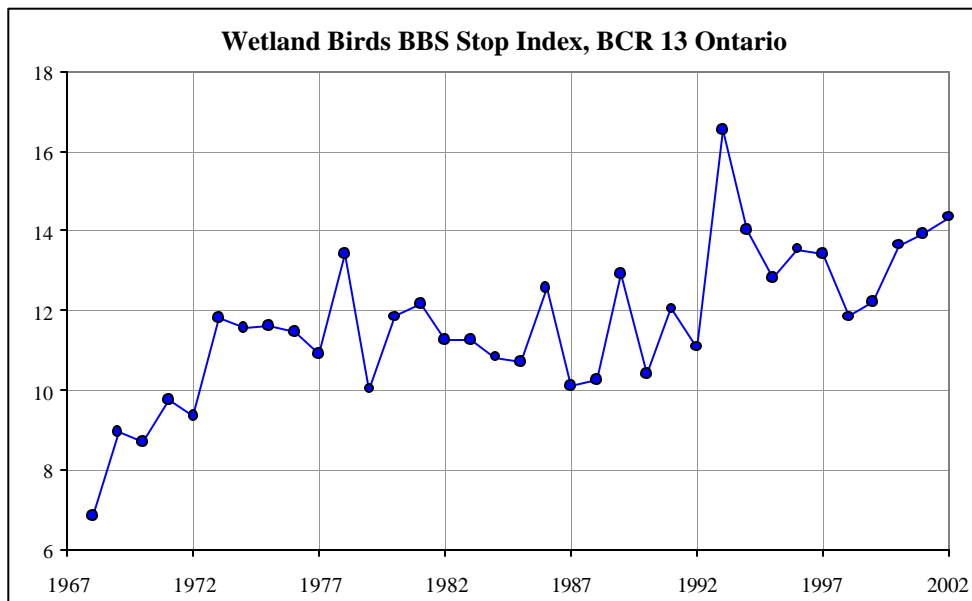
WETLAND BIRDS:

As a group, wetland birds (including non-landbirds, but excluding Red-winged Blackbirds) have been increasing in numbers over the past 35 years in southern Ontario (BCR 13), according to BBS data:

BBS Trends for Wetland Bird Guild 1967-2002, BCR 13 Ontario

Total BBS Stops: +1.2 % / year, 62 routes, $P < 0.05$

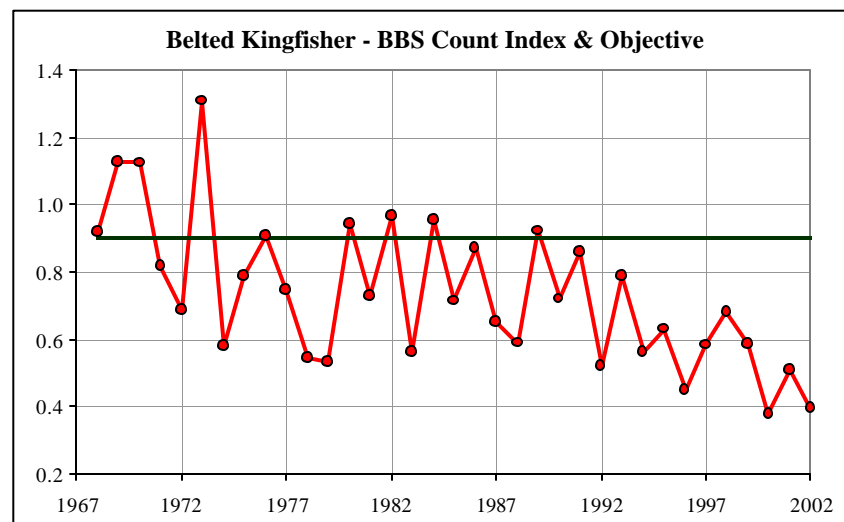
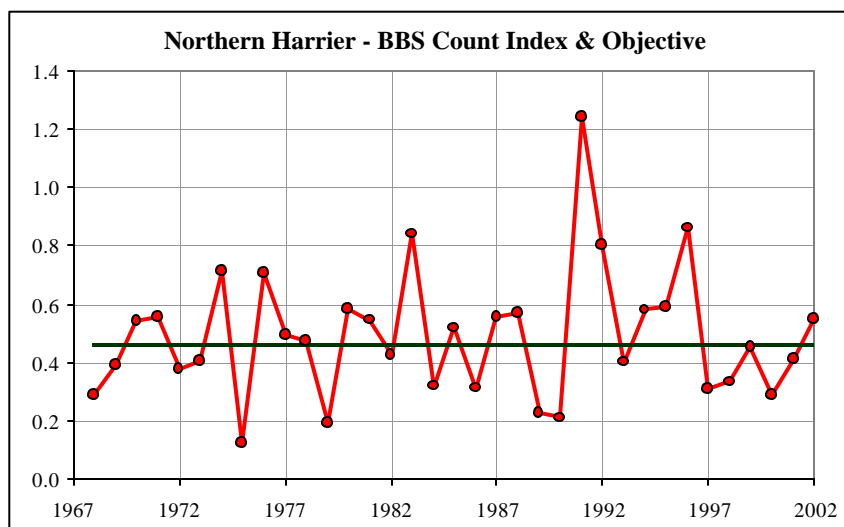
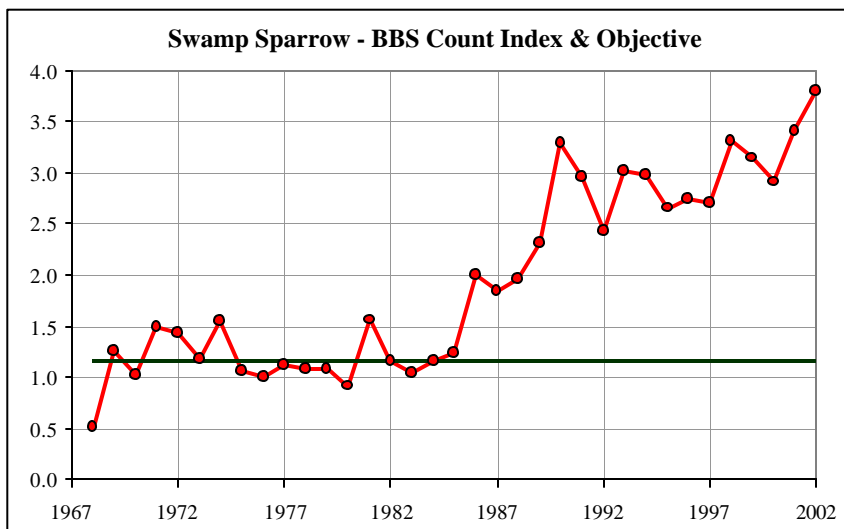
Total Abundance: +3.2 % / year, 62 routes, $P < 0.001$



Among individual wetland species, there is a mix of significant increases and declines. In addition to those shown below, some riparian species show significant declines: Belted Kingfisher, Bank Swallows and Baltimore Orioles.

Species	N	Trend (%/yr)	Sig	P
Sandhill Crane	10	23.6	*	0.003
Double-crested Cormorant	13	15.3	n	0.070
Canada Goose	57	13.7	*	0.000
Swamp Sparrow	54	4.4	*	0.017
Mallard	62	3.9	*	0.045
Great Blue Heron	61	2.2	*	0.009
Red-winged Blackbird	62	-1.3	*	0.007
Belted Kingfisher	54	-1.8	*	0.022
Green Heron	46	-1.9	n	0.095
Spotted Sandpiper	55	-3.4	*	0.004
Blue-winged Teal	41	-5.5	*	0.039
Common Moorhen	16	-7.5	*	0.031
American Black Duck	28	-8.2	*	0.004

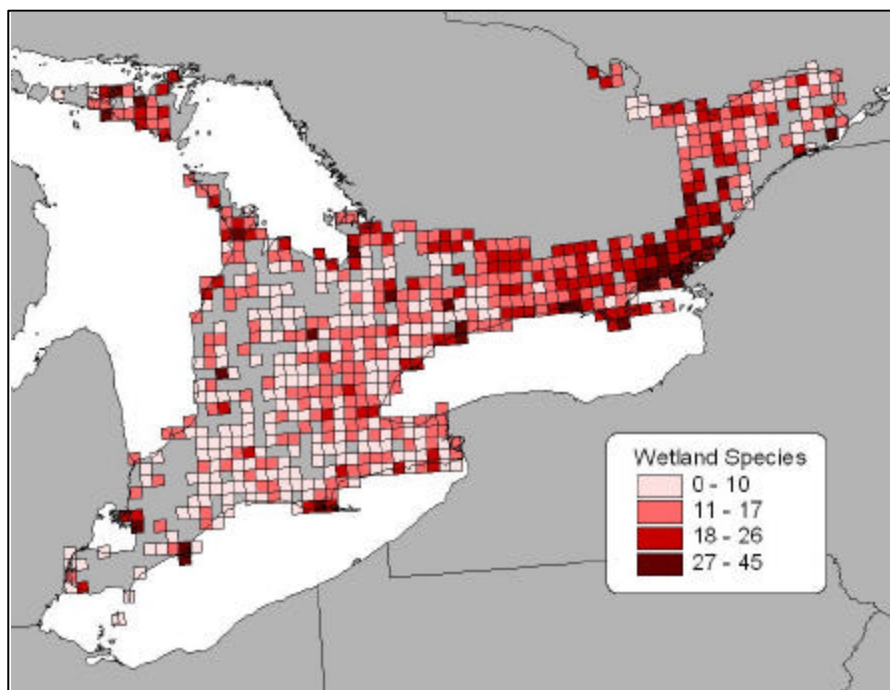
BBS annual indices for selected priority species (line is 1968-77 average):



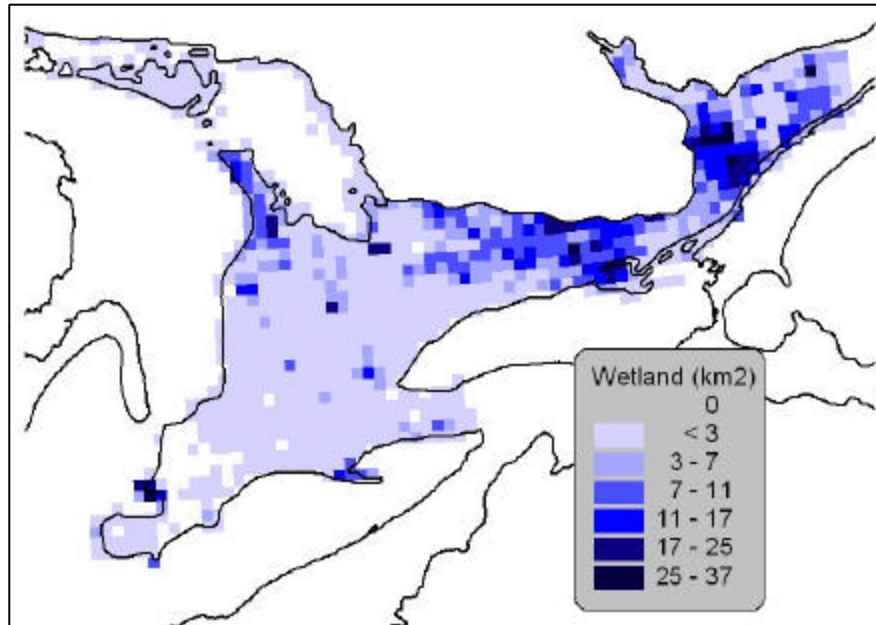
BBS Indices and estimated population sizes for priority wetland landbirds (bold = significant trends) (no trend data for Short-eared Owl).

Marsh Species	BCR 13 Trend (% / yr)	BCR 13 Ontario Trend	BBS Index 1968-77	BBS Index 2001-02	BBS Index Change	Est. Pop'n 1968 77	Est. Pop'n Change to 2001-02
Northern Harrier	0.2	0.4	0.46	0.48	+5%	4,300	200
Swamp Sparrow	2.8	4.4	1.2	3.6	208%	54,000	110,000
Shoreline Species							
Belted Kingfisher	-2.0	-1.8	0.90	0.45	-50%	30,000	-15,000
Baltimore Oriole	-1.3	-1.4	9.8	7.5	-23%	260,000	-60,000
Bank Swallow	-0.8	-3.8	21.8	6.2	-72%	650,000	-470,000

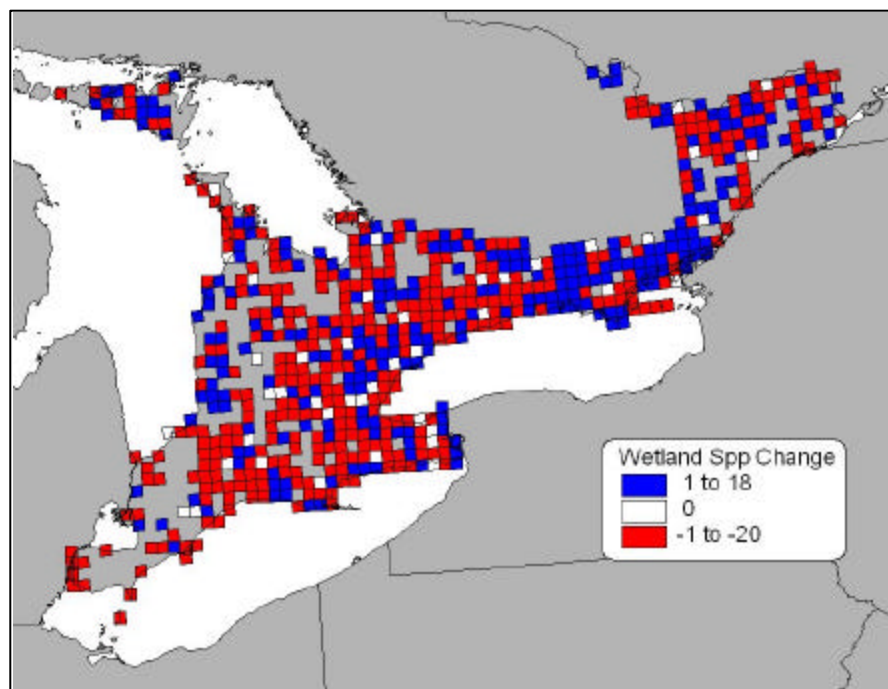
Distribution of wetland birds, from the current Breeding Bird Atlas (squares with ≥ 20 hours of effort in 2001-03). Wetland species are concentrated south of the shield, and at scattered large marshes elsewhere.



The pattern above largely reflects the geographic distribution of wetland habitat across the region:



Distribution of increases and declines in wetland species, comparing current Atlas (2001-03) vs. 1981-85 Atlas (squares with ≥ 20 hours of effort in both atlases). Decreases tend to outnumber increases, except northeast of Lake Ontario where the highest number of wetland species occur (see atlas distribution map above):



Overall there has been a small significant decrease in number of wetland bird species, largely due to a decrease in the southwestern part of BCR 13. Wetland landbirds have not decreased overall. There is a strong pattern of more positive changes in the east and northwest relative to the southwest and central subregions of BCR 13:

Wetland Species per Atlas square with 20+ hours of effort:
 1981-85: 14.8 2001-03: 13.8 Change: -1.0

Wetland Landbirds per Atlas square with 20+ hours of effort:
 1981-85: 3.4 2001-03: 3.5 Change: +0.1

Guild	Change in Species per square, 2001-03 vs 1981-85				
	BCR 13	SW	CE	EA	NW
Wetland Birds - all	-7%	-18%	-8%	3%	-3%
- wetland Landbirds	2%	-7%	0%	8%	10%

Atlas changes in priority wetland landbird species (bold = significant change, +/- = direction of non-significant changes).

Wetland Species	Atlas Squares 2001-03	Expected per 1st Atlas	Difference BCR 13	Diff. SWest	Diff. Central	Diff. East	Diff. NWest
Bald Eagle	53	10	43	13	5	12	13
Baltimore Oriole	702	700	+	-	-	-	+
Short-eared Owl	36	39	-	-5	+	-	-
Swamp Sparrow	561	588	-27	-21	+	-14	+
Belted Kingfisher	638	690	-52	-29	-12	-8	-
Northern Harrier	484	566	-82	-35	-43	-12	+
Bank Swallow	430	604	-174	-53	-62	-53	-7

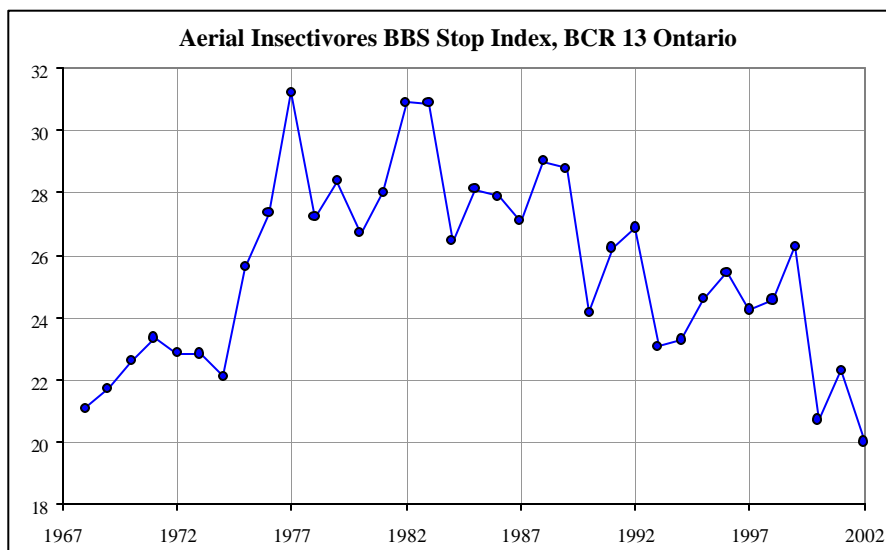
AERIAL INSECTIVORES:

Swallows, swifts, nighthawks and nightjars forage on the wing, and are here included in an aerial insectivore guild. As a group, these birds have shown no significant long-term trend in BCR 13 Ontario, positive or negative, according to BBS data. However they have decreased in numbers over the past 2 decades, following an earlier increase in numbers:

BBS Trends for Aerial Insectivore Guild 1967-2002, BCR 13 Ontario

Total BBS Stops: -0.1 % / year, 62 routes, $P > 0.10$

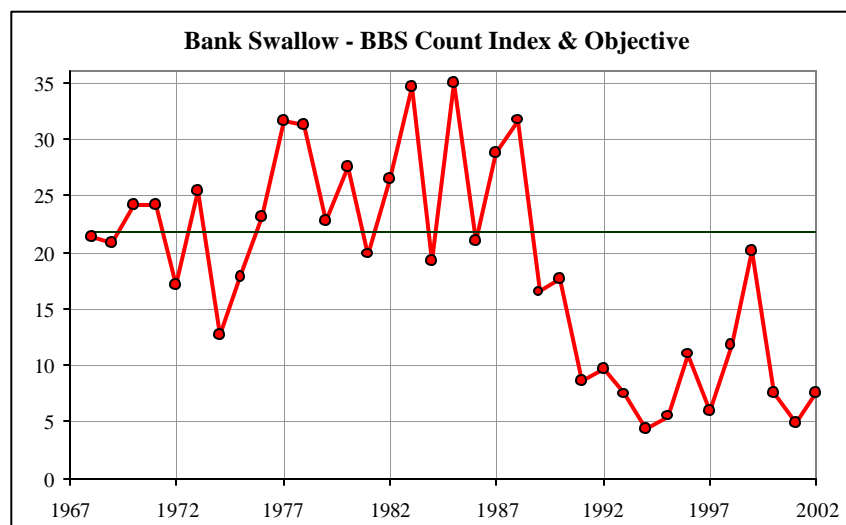
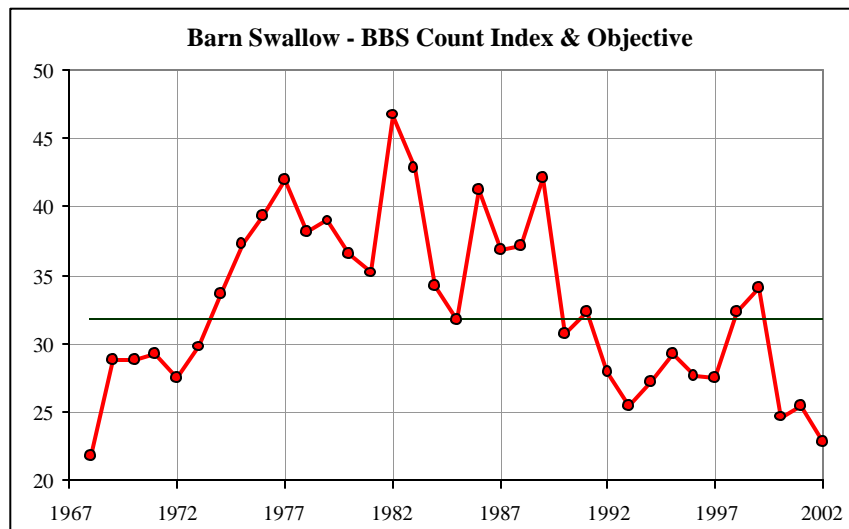
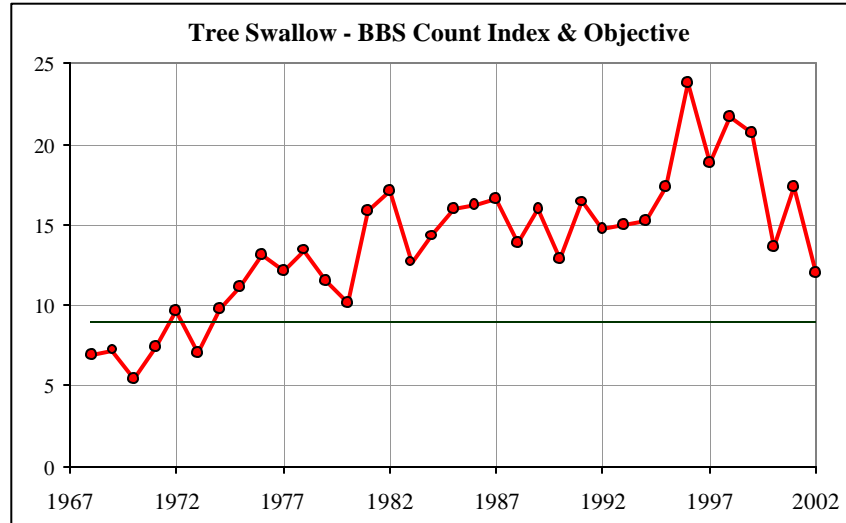
Total Abundance: -0.5 % / year, 62 routes, $P > 0.10$

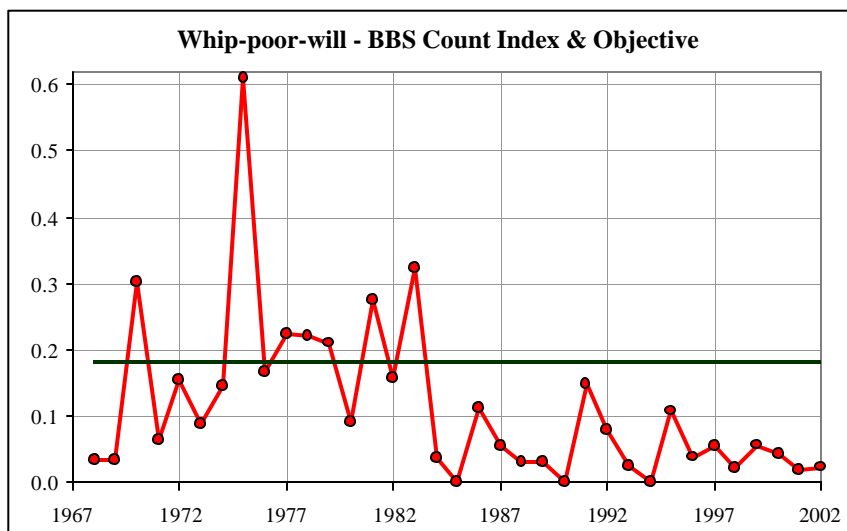
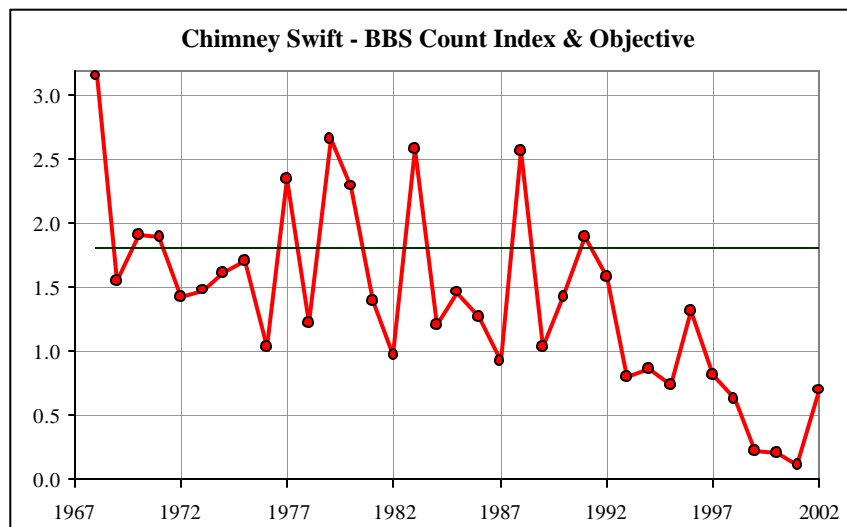


Tree Swallows have increased significantly over the full period, while Bank Swallows and Chimney Swifts are showing long-term declines. Non-significant trends for aerial insectivores are also shown below, for the 1968-2002 BBS survey period:

Species	N	Trend (%/yr)	Sig	P
Tree Swallow	62	2.7	*	0.000
Cliff Swallow	54	2.0		0.145
Barn Swallow	62	-0.5		0.520
Northern Rough-winged Swallow	50	-0.8		0.649
Common Nighthawk	15	-1.3		0.827
Purple Martin	47	-2.2		0.123
Bank Swallow	52	-3.8	n	0.052
Whip-poor-will	16	-4.5		0.544
Chimney Swift	43	-4.7	*	0.013

BBS annual indices for selected aerial insectivores (not all are priority species):

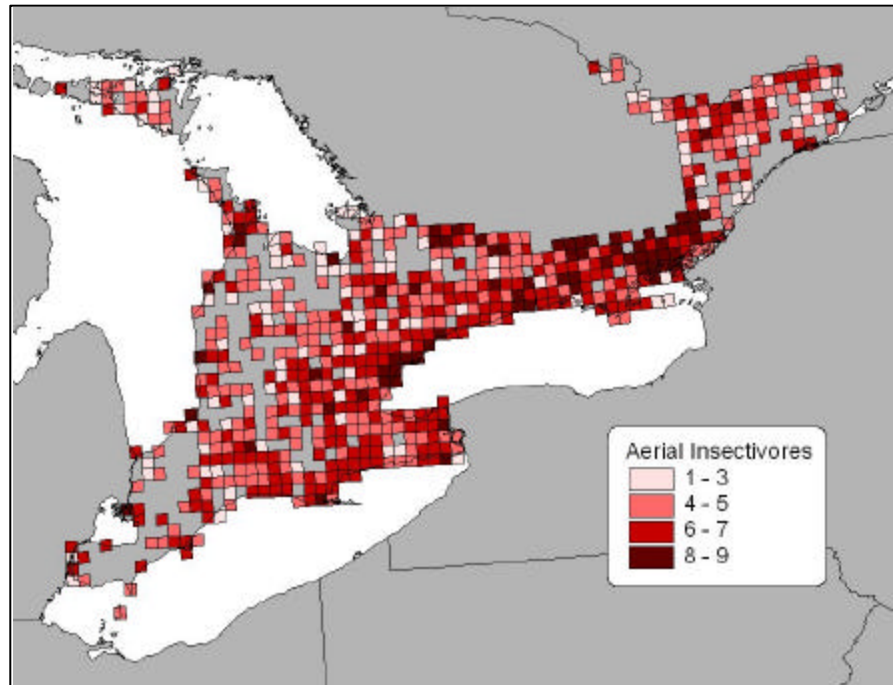




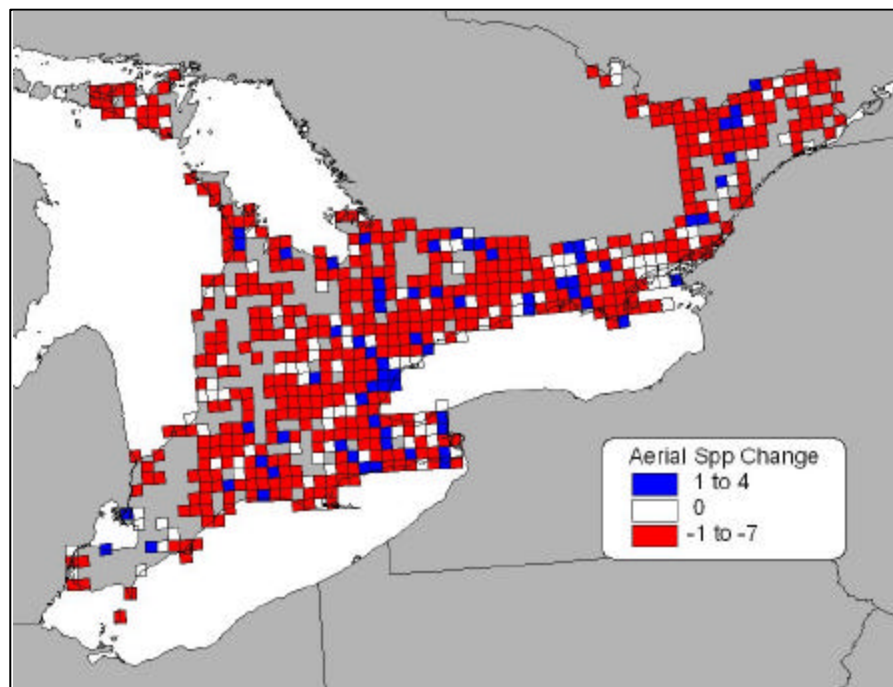
BBS Indices and estimated population sizes for priority aerial insectivore species (bold = significant trends).

Species	BCR 13 Trend (% / yr)	BCR 13 Ontario Trend	BBS Index 1968-77	BBS Index 2001-02	BBS Index Change	Est. Pop'n 1968- 77	Est. Pop'n Change to 2001-02
Whip-poor-will	-9.3	-4.5	0.18	0.02	-88%	23,000	-20,000
Chimney Swift	0.1	-4.7	1.8	0.41	-77%	57,000	-44,000
Bank Swallow	-0.8	-3.8	21.8	6.2	-72%	650,000	-470,000

Distribution of aerial insectivore species (below), from the current Breeding Bird Atlas (squares with ≥ 20 hours of effort in 2001-03).



Distribution of increases and declines in aerial insectivores, comparing current Atlas (2001-03) vs. 1981-85 Atlas (squares with ≥ 20 hours of effort in both atlases). Decreases strongly outnumber increases across the full BCR:



There has been a significant decrease in number of aerial insectivore species in all BCR 13 subregions:

Aerial Insectivore Species per Atlas square with 20+ hours of effort:
 1981-85: 6.8 2001-03: 5.3 Change: -1.5

Guild	Change in Species per square, 2001-03 vs 1981-85				
	BCR 13	SW	CE	EA	NW
Aerial Foragers	-22%	-24%	-21%	-22%	-32%

Atlas changes in aerial insectivore species (bold = significant change, +/- = direction of non-significant changes).

Aerial Insectivores	Atlas Squares 2001-03	Expected per 1st Atlas	Difference BCR 13	Diff. SWest	Diff. Central	Diff. East	Diff. NWest
Tree Swallow	707	710	-	-14	+	0	-
Chuck-will's-widow	0	5	-5	-4	-	-	-
Barn Swallow	700	708	-8	-4	-	+	-
Cliff Swallow	437	501	-64	+	-35	-28	-8
N. Rough-winged Swallow	488	608	-120	-44	-38	-29	-8
Whip-poor-will	161	298	-137	-21	-63	-40	-16
Purple Martin	347	509	-162	-65	-61	-24	-14
Bank Swallow	430	604	-174	-53	-62	-53	-7
Common Nighthawk	186	389	-203	-65	-80	-49	-9
Chimney Swift	321	536	-215	-76	-72	-52	-16