

GREATER TORONTO

RAPTOR WATCH

FALL 1996





Table of Contents

Board of Directors	1
Contributors	2
High Park Map	3
Cranberry Marsh Map	4
Volunteers	5
Historical one day peaks	8
Ontario Hawk watches, Seasonal Totals	9
1996 - 1995, High Park and Cranberry Marsh, Birds per Hour	10
High Park, Time of Day distribution of Raptor observations	11
High Park, Seasonal Summary	12
High Park, Species Account	14
High Park, 1993 to 1996	18
High Park, Day by day account	19
Cranberry Marsh, a retrospective account of the season	22
Cranberry Marsh, 1990 to 1996	24
Cranberry Marsh, Day by day account	25
Oak Ridges Moraine Hawk migration	28
High Park, Weather analysis	29
Toronto Pearson International airport, weather	31
High Park, Weather elements	33



Greater Toronto Raptor Watch
P.O. Box 14555
75 Bayly Street West
Ajax, ON, Canada L1S 7L4

1997 Board of Directors

President	John Barker
Vice- President	Rayfield Pye
Secretary / Treasurer	Mike Boudreau
Director - High Park	Alfred Adamo
Director - Cranberry	Doug Lockrey
Director - Consultant	Rob Nisbet

Greater Toronto Raptor Watch
Fall 1996, Hawk Report

Contributors

Alfred Adamo	Comparison of 1995 to 1996 counts at High Park based on Birds per Hour. High Park 1996 Seasonal Summary High Park site species accounts High Park Weather analysis
John Barker	Editing Typing Design Layout Binding Table of Contents Board of Directors Contributors Volunteer Database Comparison of Ontario Hawkwatchers, 1996 High Park 1993 to 1996 Cranberry Marsh 1990 to 1996 High Park Dailies Cranberry Marsh Dailies Pearson International Airport Weather Data
Don Barnett	High Park 1996 Seasonal Summary High Park Sites Species Accounts High Park time of day distribution of raptor observations High Park weather elements report
Dave Beadle	GTRW- Logo: Northern Harrier and a Sharp-shinned Hawk
Mike Boudreau	Cranberry Marsh - Map Cranberry Marsh - Dailies
Doug Lockrey	Cranberry Marsh - Retrospective Cranberry Marsh - Dailies Historical one day peaks
Norm Murr	High Park- Map High Park - Dailies
Rayfield Pye	Long Sault Conservation Area Hawk Count

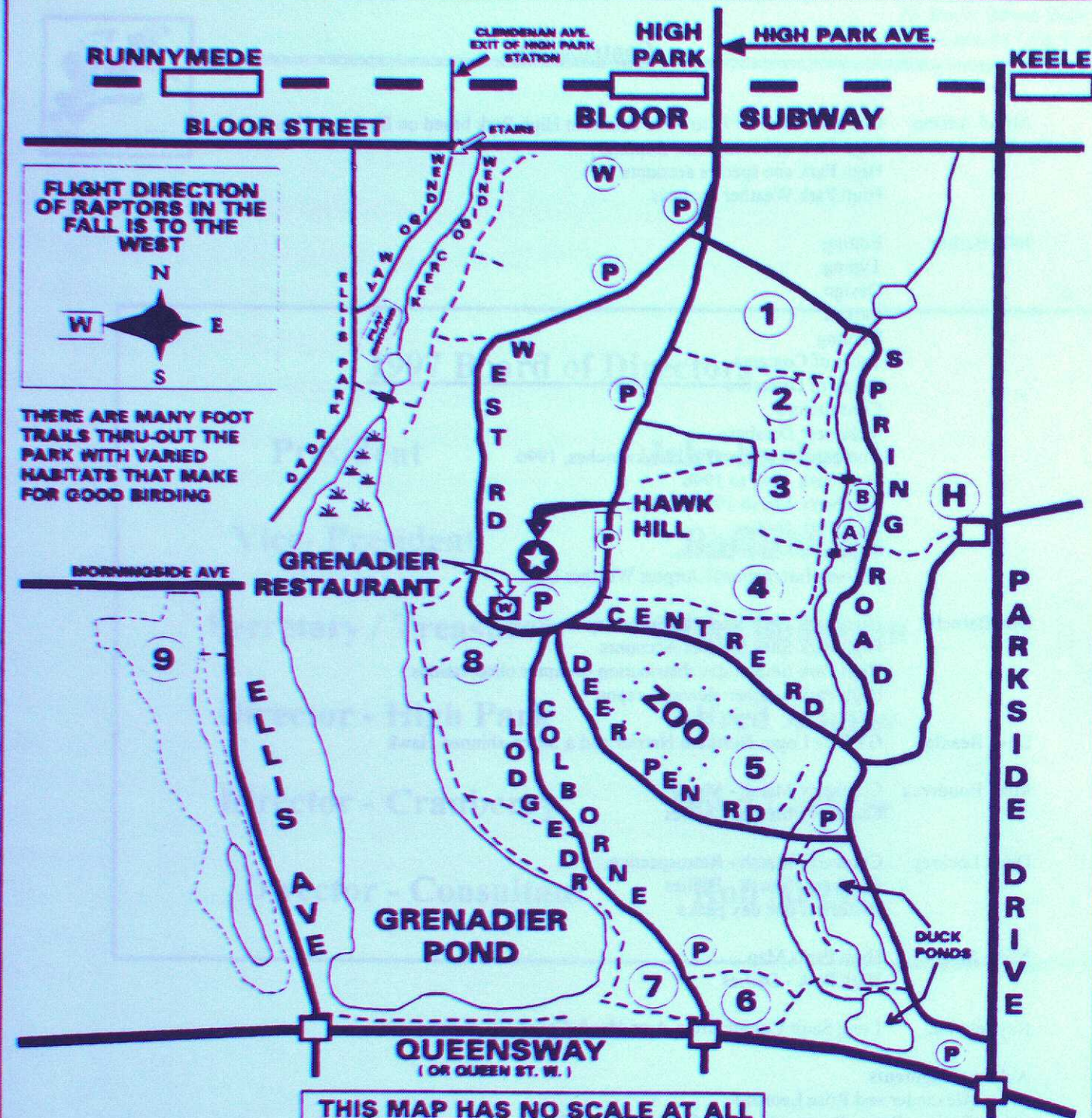
Acknowledgments

Bruce Alexander and Rose Leonard
Metro Toronto Police Printing Unit, 40 College Street, Toronto

For further information on the Greater Toronto Raptor Watch please contact

John Barker

HIGH PARK



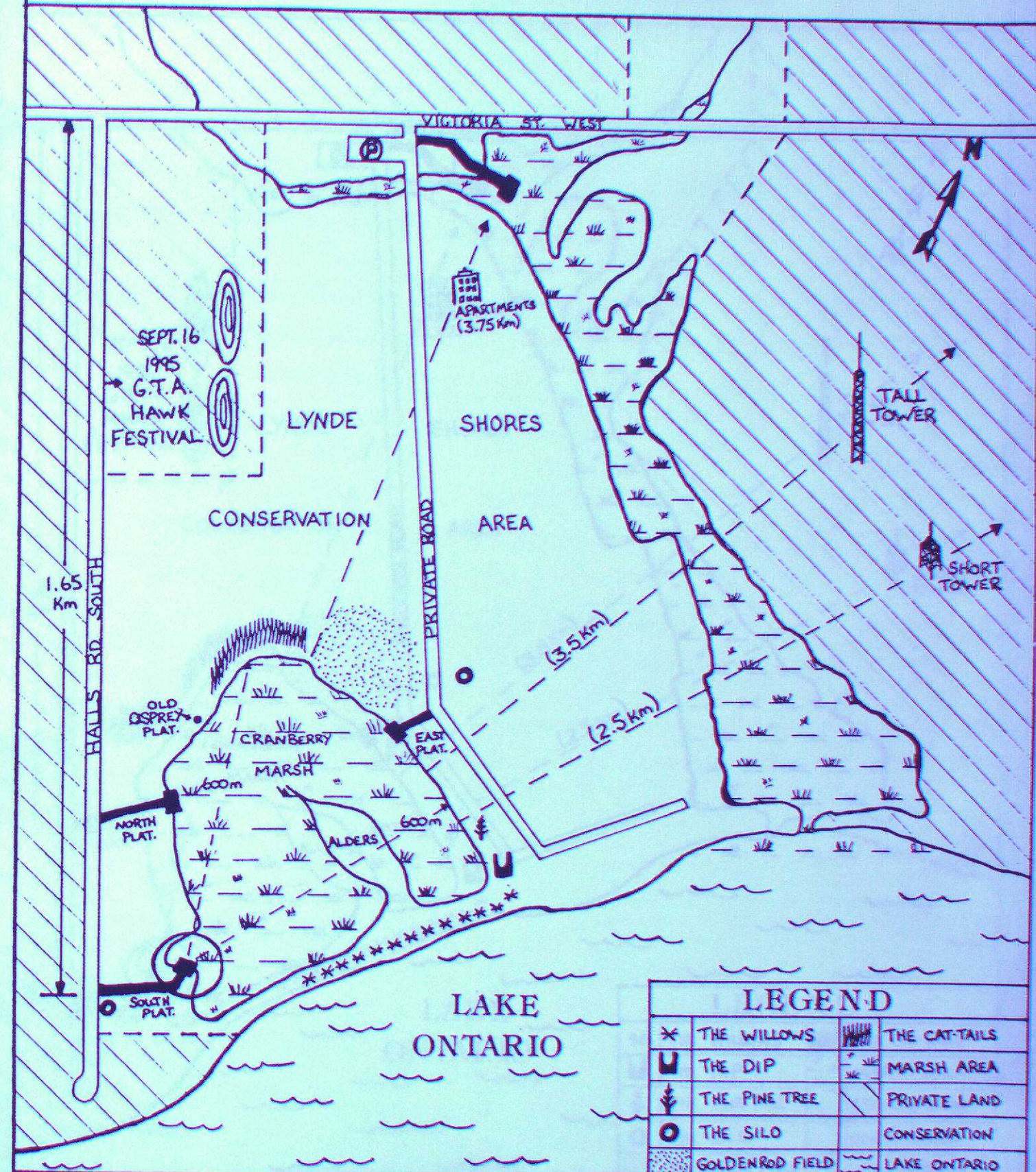
LEGEND

- 1 - SCHOOL
- 2 - WOOD CHIP PILE & SPRUCE GROVE
- 3 - ALLOTMENT GARDENS
- 4 - OUTDOOR THEATRE
- 5 - GREEN HOUSES
- 6 - COLBORNE LODGE AND VALLEY
- 7 - HOWARD MONUMENT / TOMBS AND VALLEYS
- 8 - HILLSIDE GARDENS
- 9 - REMINI PARK
- H - CARLETON STREETCAR LOOP AT HOWARD PARK AVE.
- W - SAFE WASHROOM
- P - PARKING (ALL FREE)
- - TTC STREETCAR STOP
- - BLOOR SUBWAY STATION
- A - 1st WOODEN BRIDGE
- B - 2nd WOODEN BRIDGE

NOTE - HIGH PARK IS CLOSED TO MOTORIZED TRAFFIC ON ALL SUNDAYS AND HOLIDAYS IN AUGUST AND SEPTEMBER AND ON SOME SUNDAYS IN OCTOBER.

YOU MAY PARK ON SOME STREETS OUTSIDE OF THE PARK BUT IF YOU CAN COME BY TTC IT IS NOT A LONG WALK TO THE HAWK VIEWING HILL.

CRANBERRY MARSH



LEGEND

- * THE WILLOWS
- U THE DIP
- THE PINE TREE
- THE SILO
- GOLDENROD FIELD
- THE CAT-TAILS
- MARSH AREA
- PRIVATE LAND
- CONSERVATION
- LAKE ONTARIO

DRAWN BY: MICHAEL BOULDREAU OCT. 25/95
AJAX, ONTARIO, CAN.

G.T.A. HAWK WATCH



SCALE

1 cm = 100 metres

First Name	Last Name	High Park	Cranberry	Other	Other Site Name	Counter	Obsever	Visitor
Alfred	Adamo	Yes	Yes	No		Yes	No	No
John	Ankenman	Yes	No	No		No	No	Yes
Mark	Ansell	No	Yes	No		No	Yes	No
Margaret	Bain	No	Yes	No		No	Yes	No
Stan	Bajumy	Yes	No	No		No	Yes	No
Roy	Baker	Yes	No	No		No	Yes	No
John	Barker	Yes	Yes	No		Yes	No	No
Don	Barnett	Yes	No	No		Yes	No	No
Sam	Barone	Yes	No	No		No	No	Yes
Howard	Battae	No	Yes	No		No	Yes	No
Dave	Beadle	Yes	No	No		No	Yes	No
Eleanor & Eileen	Beagan	No	Yes	No		No	Yes	No
Joe Lewis & Karen Lynn	Bearden	No	Yes	No		No	No	Yes
Brian	Beattie	No	Yes	No		No	Yes	No
Anne	Bell	Yes	No	No		No	No	Yes
Martin	Bence	No	Yes	No		Yes	Yes	No
Cecillia	Berkley	Yes	No	No		No	No	Yes
Gunner	Besel	No	Yes	No		No	No	Yes
Alan	Blewitt	No	Yes	No		No	No	Yes
Ron	Bobson	No	Yes	No		No	No	Yes
Dan	Bone	Yes	No	No		Yes	No	No
Mike & Colleen & Victor	Boudreau	No	Yes	No		Yes	Yes	No
Doug	Bowie	Yes	No	No		No	No	Yes
Roy	Brooks	No	Yes	No		No	No	Yes
George	Bryant	No	No	No		No	No	No
Wayne	Busby	Yes	No	No		No	No	Yes
Kathy	Callahan	Yes	No	No		No	No	Yes
Dave	Calvert	No	Yes	No		No	Yes	No
John	Carley	Yes	No	No		No	No	Yes
Fred	Carrite	No	Yes	No		No	No	Yes
Marg & John	Catto	Yes	No	No		No	Yes	No
David	Cattrall	No	Yes	No		No	No	Yes
Glen	Coedy	Yes	No	No		No	Yes	No
Bob & Robbie	Cumming	Yes	No	No		No	No	Yes
Hugh	Curie	Yes	No	No		No	Yes	No
Anthony	Dale	Yes	No	No		No	No	Yes
Ian	Dalton	Yes	No	No		No	No	Yes
Luther	Dean	Yes	No	No		No	No	Yes
Jerry	Demarco	Yes	No	No		No	No	Yes
Ursula	Dexter	No	Yes	No		No	No	Yes
Keith	Discipline	No	Yes	No		No	No	Yes
Alex	Dobson	No	Yes	No		No	No	Yes
Gerry & Dennise	Doekes	No	Yes	No		No	Yes	No
Dennis	Duckworth	Yes	No	No		No	Yes	No
John	Eastwood	No	Yes	No		No	No	Yes
Bill	Edmunds	No	Yes	No		No	No	Yes
Herb	Elliot	Yes	No	No		No	Yes	No
Peter	Ewens	Yes	No	No		No	Yes	No
Jim	Fairchild	No	Yes	No		No	Yes	No
Bruce	Falls	Yes	No	No		No	Yes	No
Kenn	Fawthrop	No	Yes	No		No	No	Yes
Luc	Fazio	Yes	No	No		No	Yes	No
John	Floegal	No	Yes	No		No	No	Yes
Gerald	Frechette	No	Yes	No		No	No	Yes
Gord	Gallant	No	Yes	No		No	Yes	No
Dave	Gascoigne	No	Yes	No		No	Yes	No
Ray	Geras	Yes	No	No		No	Yes	No
Ed	Gillan	No	Yes	No		No	No	Yes
John	Glancy	Yes	No	No		No	No	Yes
Barb	Glass	No	Yes	No		No	No	Yes

First Name	Last Name	High Park	Cranberry	Other	Other Site Name	Counter	Obsever	Visitor
Brette	Griffin	No	Yes	No		No	No	Yes
Jim	Griffith	Yes	No	No		No	No	Yes
Jerry	Guild	Yes	No	No		No	Yes	No
Carol	Guy	Yes	No	No		No	Yes	No
Sid & Dot	Hadlington	No	Yes	No		No	No	Yes
Celia	Harte	Yes	No	No		No	No	Yes
Brian	Henshaw	No	Yes	No		No	Yes	No
Verna	Higgins	Yes	No	No		No	No	Yes
Tyler	Hoar	No	Yes	No		No	Yes	No
Brian	Hobbs	No	Yes	No		No	No	Yes
Theo	Hoffman	No	Yes	No		No	Yes	No
Phill & Matt	Holder	No	Yes	No		No	Yes	No
Jim	Hummel	Yes	No	No		No	No	Yes
Jean	Iron	Yes	Yes	No		No	Yes	No
Andrew	Jano	Yes	No	No		No	No	Yes
Al	Jaramillo	No	Yes	No		No	No	Yes
Don	Jennis	Yes	No	No		No	No	Yes
Ed	Johns	No	Yes	No		No	No	Yes
Dana	Jonak	No	Yes	No		No	No	Yes
Barbara	Kalthoff	Yes	No	No		No	No	Yes
James	Kamstra	No	Yes	No		No	No	Yes
John	Kelly	Yes	No	No		No	No	Yes
Harry	Kerr	No	Yes	No		No	Yes	No
Mike	King	Yes	Yes	No		No	Yes	No
Richard	King Baker	No	Yes	No		No	No	Yes
Hilde	Kittell	Yes	No	No		No	No	Yes
Eric	Koe	No	Yes	No		No	No	Yes
Judy	Kuramoto	Yes	Yes	No		No	Yes	No
Anthony	Lang	No	Yes	No		No	No	Yes
Phylis	Lehto	Yes	No	No		No	No	Yes
Alfred	Lisk	No	Yes	Yes Myrtle, Durham RM		Yes	Yes	No
Doug	Lockrey	No	Yes	No		Yes	Yes	No
Bunky	Lukasik	Yes	Yes	No		No	No	Yes
Fred	Lyonde	Yes	No	No		No	Yes	No
Barry Kent	MacKay	No	Yes	No		No	No	Yes
Barbara	Mann	Yes	No	No		No	Yes	No
Naish & Sheila	McHugh	Yes	No	No		Yes	Yes	No
John	McKay	Yes	No	No		No	No	Yes
Craig	McLaughlan	Yes	Yes	No		No	Yes	No
Carol	McLenn	No	Yes	No		No	No	Yes
Elizabeth	Mihalj	Yes	No	No		No	No	Yes
Dave	Milson	Yes	No	No		No	Yes	No
Dorchen & Werner	Mohr	No	Yes	No		No	No	Yes
Susan	Morgan	No	Yes	No		No	No	Yes
Larry	Morse	Yes	No	No		No	Yes	No
Norm	Murr	Yes	Yes	No		Yes	Yes	No
Joelle	Murray	Yes	No	No		No	No	Yes
Margaret	Nevill	No	Yes	No		No	No	Yes
Rob	Nisbet	No	Yes	Yes Second Marsh, Durha		Yes	No	No
Graham	Nord	No	Yes	No		No	No	Yes
Dave	O'Brian	No	Yes	No		No	No	Yes
Terry	Osborne	Yes	Yes	No		No	Yes	No
Edge & Betty	Pegg	No	Yes	No		No	No	Yes
Don	Perks	Yes	No	No		No	Yes	No
Don	Peuramaki	No	Yes	No		No	Yes	No
Frank	Pinilla	Yes	Yes	No		No	Yes	No
Ron	Pittaway	Yes	Yes	No		No	Yes	No
Rayfield	Pye	No	Yes	Yes Long Sault C.A, Durha		Yes	Yes	No
Alfred	Raab	Yes	No	No		No	No	Yes
Ken	Ridge	No	Yes	No		No	No	Yes

GREATER TORONTO RAPTOR WATCH
FALL MIGRATION AND HISTORICAL ONE DAY PEAKS
HIGH PARK -TORONTO, CRANBERRY MARSH -WHITBY

First Name	Last Name	High Park	Cranberry	Other	Other Site Name	Counter	Obsever	Visitor
Helene	Rimmele	Yes	No	No		No	No	Yes
Alex	Rivers	Yes	No	No		No	No	Yes
Maryanne	Rizzo	Yes	No	No		No	No	Yes
Terry	Smith1	No	Yes	No		No	Yes	No
John	Sabeau	No	Yes	No		No	No	Yes
Greg	Sadowski	No	Yes	No		No	Yes	No
Altheid	Salamon	No	Yes	No		No	No	Yes
Leon	Schlichter	Yes	Yes	No		Yes	Yes	No
Ron	Scovell	No	Yes	No		No	No	Yes
Carol	Sellers	Yes	No	No		No	No	Yes
Joe	Serensits	No	Yes	No		No	No	Yes
Anel	Shamir	No	Yes	No		No	Yes	No
David	Shannon	No	Yes	No		No	Yes	No
Terry & Elizabeth	Shiels	Yes	No	No		No	No	Yes
Bob	Shillabeer	No	Yes	No		No	Yes	No
David	Shilman	No	Yes	No		No	No	Yes
Dave	Shirley	No	Yes	No		No	Yes	No
Jay	Silverberg	No	Yes	No		No	Yes	No
Dave	Skwarwa	Yes	No	No		No	No	Yes
Roy	Smith	Yes	No	No		No	Yes	No
Don	Solley	Yes	No	No		No	No	Yes
Mike	Solomon	Yes	No	No		No	No	Yes
Dr. Murray	Speirs	No	Yes	No		No	Yes	No
Derek&Daphne	Spindlow	No	Yes	No		No	No	Yes
Brian	Steele	No	Yes	No		No	Yes	No
John	Stevens	No	Yes	No		No	Yes	No
Mike	Street	No	Yes	No		No	Yes	No
Teo	Televi	No	No	Yes	Scarborough Bluffs	Yes	No	No
Calci	Tanti	Yes	No	No		Yes	Yes	No
Ken	Teasdale	Yes	No	No		No	Yes	No
Anne	Thompson	No	Yes	No		No	No	Yes
Johanne	Tito	No	Yes	No		No	No	Yes
Ron	Tozer	No	Yes	No		No	Yes	No
Janice	Turner	No	Yes	No		No	No	Yes
Danielle	Vinson	No	Yes	No	Oshawa, Durham	Yes	No	No
Jerry	Walsh	No	Yes	No		No	Yes	No
Eleanor	Wellman	No	Yes	No		No	Yes	No
Peter	Whelan	Yes	No	No		No	No	Yes
Don	Wiens	No	Yes	No		No	Yes	No
Brian	Wilkie	Yes	No	No		No	No	Yes
Margaret	Wilson	No	Yes	Yes	Second Marsh, Durha	No	Yes	No
Chris	Wise	No	Yes	No		No	No	Yes
Steve	Wood	No	Yes	No		No	Yes	No
David	Worthington	Yes	Yes	No		No	Yes	No
Ed	Wugalter	Yes	Yes	No		No	No	Yes
Bob	Yukich	Yes	No	No		Yes	Yes	No
William & Winnie	Yung	Yes	No	No		No	Yes	No

Species Name	September E M L	October E M L	November E M L	Peaks
Turkey Vulture				930 Oct 3.96
Osprey				24 Sep 15.96
Bald Eagle				8 Sep 18.96
Northern Harrier				87 Sep 17.94
Sharp-shinned Hawk				618 Sep 18.96
Cooper's Hawk				34 Oct 14.96
Northern Goshawk				11 Oct 29.95
Red-shouldered Hawk				120 Oct 13.91
Broad-winged Hawk				5343 Sep 18.94
Red-tailed Hawk				1268 Oct 29.95
Rough-legged Hawk				47 Nov 8.90
Golden Eagle				10 Oct 28.95
American Kestrel				229 Sep 11.91
Merlin				9 Sep 11.91
Peregrine Falcon				7 Sep 29.90

Key: Range of Flight _____ Peak Period _____ Early=E, Middle=M, Late=L

GREATER TORONTO RAPTOR WATCH

Comparison of Hawk watch sites in Ontario, Fall 1996

Seasonal Totals from each site

Species\ Sites	CMRW	HPRW	HCHW	HBMO	TOTAL
Turkey Vulture	1,175	2,029	4,393	19,645	27,242
Osprey	86	76	142	109	413
Bald Eagle	19	24	106	22	171
Northern Harrier	76	37	399	346	858
Sharp-shinned Hawk	1,363	3,403	5,775	10,964	21,505
Cooper's Hawk	42	155	557	507	1261
Northern Goshawk	13	15	52	22	102
Red-shouldered Hawk	7	303	268	416	994
Broad-winged Hawk	2,423	5,439	47,552	108,480	163,894
Swainson's Hawk	0	0	1	0	1
Red-tailed Hawk	527	2,165	2,245	6,727	11664
Ferruginous Hawk	0	0	0	0	0
Rough-legged Hawk	21	21	33	76	151
Golden Eagle	9	13	61	79	162
American Kestrel	378	367	2,350	1,951	5046
Merlin	17	36	52	47	152
Peregrine Falcon	14	5	83	56	158
Gyr Falcon	0	0	0	0	0
Unidentified Raptors	76	132	33	87	328
Total	6,246	14,220	64,102	149,534	

Lake Ontario	Location	Abbr. Used
Cranberry Marsh	Whitby	CMRW
High Park	Toronto	HPRW
Lake Erie		
Hawk Cliff	Port Stanley	HCHW
Holiday Beach	Malden Centre	HBMO

Literature cited:

Hubert,R. 1996. Hawk Cliff Raptor Banding Station, 1996 Newsletter
Learnmouth,B. Editor, The Northwind, Winter 1997 Vol.#12 No.1, Holiday Beach M.O.

GREATER TORONTO RAPTOR WATCH

Comparison of 1996 to 1995 counts based on birds per hour

Species/Station Years/ %	High Park			Cranberry		Marsh
	1996	1995	% Change	1996	1995	% Change
Turkey Vulture	4.37	1.21	261	5.76	1.66	247
Osprey	0.16	0.12	33	0.3	0.15	100
Bald Eagle	0.05	0.04	25	0.066	0.07	-6
Northern Harrier	0.08	0.37	-78	0.27	0.41	-34
Sharp-shinned Hawk	7.33	8.33	-12	4.75	3.38	40
Cooper's Hawk	0.33	0.34	-3	0.146	0.147	-0.7
Northern Goshawk	0.03	0.09	-67	0.045	0.126	-64
Total Accipiter	7.7	8.77	-12	4.94	3.65	35
Red-shouldered Hawk	0.65	1.26	-48	0.024	0.072	-67
Broad-winged Hawk	11.72	15.69	-25	8.44	3.81	122
Red-tailed Hawk	4.67	12.13	-62	1.84	3.36	-45
Rough-legged Hawk	0.045	0.092	-51	0.073	0.307	-76
Total Buteo	17.09	29.18	-41	10.38	7.55	37
Golden Eagle	0.028	0.092	-70	0.031	0.054	-43
American Kestrel	0.79	1.27	-38	1.32	1.23	7.3
Merlin	0.078	0.121	-36	0.06	0.13	-54
Peregrine Falcon	0.011	0.021	-48	0.049	0.039	26
Total Falcon	0.88	1.41	-38	1.43	1.4	2
Unidentified Raptors	0.28	0.71	-61	0.27	0.44	-39
Raptor Total	30.65	41.91	-27	23.43	15.37	52

Greater Toronto Raptor Watch

High Park September 1 to November 30 1996

By: Donald W. Barnett

Time of Day Distribution of Raptor Observations

Eastern Standard Time

Species	06:00 to 07:00	07:00 to 08:00	08:00 to 09:00	09:00 to 10:00	10:00 to 11:00	11:00 to 12:00	12:00 to 13:00	13:00 to 14:00	14:00 to 15:00	15:00 to 16:00	16:00 to 17:00	Total
TV			78	103	125	406	430	339	276	204	108	2069
OS			3	8	12	7	21	17	5	3		76
BE					1	5	8	6	2	2		24
NH			3	4	4	11	6	4	2	3		37
SS	18	70	193	353	765	713	467	396	263	146	19	3403
CH	3	7	16	8	25	35	33	20	6	2		155
NG			1	2	2	4	2	2	1	1		15
RS			1	18	37	41	86	81	24	15		303
BW			50	166	1,440	1,933	824	295	265	466		5439
RT		5	14	77	193	356	556	468	301	167	28	2165
RL				1	3	5	4	3	5			21
GE					2	5	4	2				13
AK	6	12	20	12	34	52	71	62	46	41	11	367
ML	4	7	5	3	3	2	6	1	3	2		36
PG				2			1	2				5
Total	31	101	384	757	2646	3575	2519	1698	1199	1052	166	14128

HIGH PARK 1996 SEASONAL SUMMARY

Observations were made from the site on "Hawk Hill" for four hundred and sixty four hours spread over sixty five days from September 1st to November 27th. That the hourly coverage was double that in 1995 is due largely to the herculean efforts of two individuals: Norm Murr and Don Barnett.

The total number of raptors observed was 14,230 of which 38.2% were Broad-winged Hawks, 23.9% were Sharp-shinned Hawks, 15.2% were Red-tailed Hawks and 14.3% were Turkey Vultures. Total raptor numbers were up 42% from last season but birds per hour at 30.7 were down 27% from 1995.

The most marked increases over last season were recorded for the following species: Turkey Vulture, Osprey and Bald Eagle. Significant decreases were noted for Northern Harrier, Golden Eagle and Red-tailed Hawk. While absolute numbers for Sharp-shinned and Cooper Hawks were well up over 1995, they were lower on a birds-per-hour basis.

Seasonal high marks were established for the following species: Turkey Vulture, Osprey, Bald Eagle, Sharp-shinned Hawk, Cooper Hawk, Red-shouldered Hawk, American Kestrel and Merlin. New one day highs were recorded for Turkey Vulture, Osprey, Bald Eagle, Sharp-shinned Hawk, Cooper Hawk, American Kestrel and Merlin (tied).

Unusual sightings included a very late Osprey on November 2nd and a Turkey Vulture with a silver wing tag on November 4th. No very rare species or colour morphs were recorded this season.

This season was notable for the relatively small numbers of "Big Days", especially on weekends. Only in the first half of October, when the weather had some semblance of predictability, was there any consistency in flight pattern. If one had missed the four biggest flight days of the year on September 18, 19, October 3 and 14th, 68% of the total hawk movement would have been missed. 95% of the Broadwings moved through on only two days: September 18th and 19th, while 46% of the Turkey Vultures passed over on October 3rd.

October 14th was in every way a special day for the High Park Hawk Watch. Peak seasonal counts were recorded for Red-tailed Hawk (371), Cooper's Hawk (34) and Red-shouldered Hawk (58). The Sharp-shinned Hawk total of 549 was the second highest for the season (and ever). It was also the Canadian Thanksgiving Day and the good weather attracted a crowd of observers and visitors to Hawk Hill. Norm Murr said "This is a great day for the number of birds and the number of observers, helpers and visitors on the hill. We had during the day more than 100 people on the hill and the birds did not disappoint us."

It is hoped that in future years, a significant data bank can be established which can justify the use of more sophisticated statistical comparison of count numbers. Establishing long-term population trends can then be established, especially if the raptors can be recorded by age class. We also need to further standardize our monitoring procedures with those at a few of the more advanced sites.

During the last few years, the High Park Hawk Watch has had the support and co-operation of the City of Toronto Parks and Recreation staff at High Park. The Hawk Watch is now a recognized park activity. The hill will remain in its natural condition but there will continue to be extensive plantings of native plants and grasses which will enhance its condition as a part of the park's remnant Oak Savannah habitat.

HIGH PARK SITE SPECIES ACCOUNTS

Sharp-shinned Hawk

On September 1st, the opening day of the High Park Hawk Watch, the observers were greeted by a trickle of migrating Sharp-shinned Hawks. These flights built up to a two day peak on September 18-19 with 618 and 609 birds respectively. The second figure represents a new one-day high for this site. These two days were characterised by moderate to strong north to northwest winds with about 50% cloud cover on the 18th and clear skies on the 19th. Daily numbers dropped off after these two days but picked up again on October 3rd, 10th and 14th, with flights of 303, 323 and 549 birds respectively. The last date marked the end of any significant daily numbers for this species.

Optimum weather conditions for Sharp-shinned Hawk observations at High Park appeared to be strong winds from a northwest direction, relative humidity between 56-70% and barometric pressure between 101.0 and 101.99 kilopascals. The seasonal peak hourly flights were between 1000 and 1100 hours E.S.T.

Bald Eagle

The first Bald Eagle appeared on September 4th, tacking against a light south breeze. Twenty birds were seen during September, three were adult birds with the remainder immature. Four more birds, 1 adult and 3 immature, were seen later in the season with the last bird going through on November 20th.

The record numbers of Bald Eagles seen, along with Ospreys, may be a reflection of their steady population recovery since the banned use of D.D.T. in Canada and the U.S. in the early 1970's.

Bald Eagles were generally observed on medium to strong winds (79.2%) from the northwest (58.3%), at a barometric pressure range of 101.0 - 101.99 kp (91.7%).

More Bald Eagles were observed in the 1200 - 1300 E.S.T. time period than any other hourly time period.

Osprey

Osprey sightings were first made on the first of September with birds appearing regularly during the month. The peak day of 15 observations occurred on September 10th with a cluster of 38 sightings between September 15 and 17th. An unusually late Osprey appeared on November 2nd.

This year, and at this site, Osprey seemed to be less influenced than any other raptor by preferred weather conditions for migration. Observations were made during a variety of wind speeds and directions. 42.1% of the Osprey sightings occurred with winds from a southerly (SE,S,SW) wind direction component, about the same as from a northwest component (39.5%).

Broad-winged Hawk

Small movements of Broad-winged Hawks took place on September 10th but the real show was on September 18 with 2120 birds and 3056 birds seen on September 19th. After these two days, the Broad-winged migration was essentially over.

The weather conditions which existed for this two day flight were as follows: strong northwest and north winds, relative humidity between 50 and 70%, and barometric readings ranging between 101.61 and 101.90 kp. The peak numbers occurred between 1000 and 1600 hours E.S.T. on the 18th and between 0900 and 1300 hours E.S.T. on the 19th. The first day had 50% cloud cover but the second day was cloudless that made spotting the hawks more difficult. By the afternoon of the 19th, the Broad-wings may have been too high to count against a cloudless sky.

American Kestrel

American Kestrel were recorded in unusually low numbers until September 18th, when 103 kestrels were counted. The peak count of 112 kestrels didn't occur until October 3rd.

Best days for American Kestrel observation were those with winds from a northwesterly direction. The peak hourly period was between 1200 and 1300 hours E.S.T.

Cooper's Hawk

Cooper's Hawks were recorded regularly between September 10th and November 10th, with the peak number of 34 hawks observed on October 14th.

Again, a majority (55.5%) of birds were recorded with northwest winds. The seasonal hourly peak was between 1100 and 1200H E.S.T.

Northern Goshawk

Numbers recorded this season at High Park at 15 were relatively low. It did not appear that this was a year at the peak of their population cycle.

Most Goshawks were recorded with medium strength winds (73.0%) out of the northwest (66.6%).

Northern Harrier

A significant Harrier movement never materialized with only 37 Harriers recorded. Numbers were scattered throughout the season with no significant peak days. Historically, the major peak for this species should have been between September 18-20th. Counts were well down on other

counts on the north shore of Lakes Ontario and Erie. There is speculation that they had a poor nesting season in 1996.

Most Harriers (81.1%) were recorded with a northerly wind component (NW-NE). Interestingly, almost all (89.2%) birds observed was with a cloud cover of at least 60%.

Merlin

The 36 Merlin seen this season were bunched between September 6th and October 14th, with a peak of 7 birds observed on October 10th. As was typical of previous seasons, a significant percentage (30.5%), rocketed past in the early morning hours between dawn and 0800 E.S.T.

The majority of the season's count (63.9%) were seen when the wind had a northwesterly component. Like Northern Harriers, they were most often observed under overcast conditions; 63.9% were recorded when the cloud cover was at least 80%.

Peregrine Falcon

Only five peregrines were observed this season at High Park, the same number that was recorded in 1995. They tend to be more commonly observed along the Lake Ontario shoreline.

Sample size was too small to present a weather profile for this species.

Turkey Vulture

Turkey Vulture numbers were up sharply over 1995 with total birds increasing to 2029 from 290 and birds per hour increasing to 4.373 from 1.129. This reflects the unfavourable flight conditions for them in 1995 and the much improved flight conditions in 1996.

The weather conditions during the peak passage of 930 on October 3rd was a strong northwest wind with a barometric reading of 103.06 kp. These conditions seemed to favour Turkey Vulture migration throughout the observation season. The 437 vultures recorded on October 14th was their last significant passage over High Park this season.

A single group of 103 Turkey Vultures was observed during the watch moving westwards well north of the High Park site on October 13th between and 1200 and 1300 E.S.T. At about 1100 E.S.T., a group of roughly the same size was observed over a location at Lawrence Ave. East and Mount Pleasant Road, about 11 km. northeast of the High Park site. That day the winds were light out of the southwest. Could this have been the same flock travelling southwestward?

Golden Eagle

The first four of the season's 13 Golden Eagles were seen on October 25th heading into a moderate southwest breeze. Another three were observed on October 28th, two on October 31st, three on November 3rd and the last one on November 13th. Of the 12 Golden Eagles that could be aged 3 were adults.

The wind direction on all days when Golden Eagles were recorded were either northwest or southwest.

Red-tailed Hawk

The passage of Red-tailed Hawks this season was unspectacular with a low peak of 371 Red-tails on October 14th. Numbers recorded (2165) were well below 1995 levels (2902). Birds per hour was well down; 4.067 in 1996 versus 16.326 in 1995.

The weather profile for Red-tailed Hawk migration was medium to strong winds (92.4%) from a northwesterly mode (83.2%), with a barometric pressure between 101.0 - 102.99 kp (79.1%) and a relative humidity between 56-70% (91.7%). Red-tailed Hawk flights at High Park appear to be strongly influenced by the passage of cold fronts.

Red-shouldered Hawk

The flight at High Park began on October 3rd with 35 hawks and continued irregularly thereafter until November 25th. The peak count of 58 Red-shoulders on October 14th was rather early for High Park.

Ideal weather conditons for observation of this species at High Park appeared to be strong winds (60.7%) from a northwesterly direction (91.0%), with a relative humidity between 56-70% (78.9%).

Rough-legged Hawk

The passage of 21 Rough-legs was about average in numbers at High Park in comparison to past seasons.

Like Northern Goshawks, the highest numbers were recorded with medium winds (71.4%) out of a northwesterly direction (76.2%).

GREATER TORONTO RAPTOR WATCH

Station: High Park
Location: Toronto, Ontario, Canada

Species/ Year	1993	1994	1995	1996	94-96 avgs
Turkey Vulture	291	1,711	290	2,029	1,343
Osprey	5	39	28	76	48
Bald Eagle	0	19	10	24	18
Northern Harrier	19	277	88	37	137
Sharp-shinned Hawk	751	1,742	1,993	3,403	2,379
Cooper's Hawk	32	50	82	155	96
Northern Goshawk	10	11	22	15	16
Red-shouldered Hawk	85	161	301	303	255
Broad-winged Hawk	261	9,408	3,751	5,439	6,199
Swainson's Hawk	0	0	1	0	NA
Red-tailed Hawk	781	2,650	2,898	2,165	2,571
Rough-legged Hawk	6	10	22	21	18
Golden Eagle	4	15	22	13	17
American Kestrel	75	409	304	367	360
Merlin	0	15	29	36	27
Peregrine Falcon	0	2	5	5	4
Unidentified Raptors	18	146	170	132	NA
Season Total	2,338	16,665	10,016	14,220	
Days	6	36	39	65	36.5
Hours	48	100	239	464	212.75
Birds/Hour	48.7	166.7	41.9	26.3	66.8

Greater Toronto Raptor Watch

High Park, Fall 1996

Date	HR	TV	OS	BENH	SS	CHNG	RS	BW	RT	RL	GE	AK	ML	PG	UR	TT	COMMENTS
1-Sep	7	2	1	22	2	3	5	30									
2-Sep	7	1	3	1	1	5	10										
3-Sep	5		1	10	1	1	14										14 BE; imm 1:15pm
4-Sep	7	2	1	4	2	1	7										
5-Sep	5:25	2	1	1	2	1	17										
6-Sep	6:5	2	1	12	3	1	282										
9-Sep	6		1	66	185	4	30										282 BE; Ad -12:18, Imm - 13:28
10-Sep	8	15	2	19	1	1	30										
11-Sep	8	7	1	2	1	1	4										
14-Sep	5:5	1	1	40	1	2	57										
15-Sep	9	11	1	113	31	1	165										
16-Sep	7:5	13	1	271	2	4	338										BE; 14:02, 14:49, 15:23 / Imm.
17-Sep	9	1	3	8	2	4	2923										BE; imm- 1:12, 1:17, 1:32, 2:25, 2:29, 2:59, 3:03pm / AD- 4:53pm
18-Sep	10	43	3	618	2	17	3655										BE; 4th yr- 7:31am / 1st yr 12:47-2
19-Sep	8:5	21	4	509	8	21	113										
20-Sep	6	1	1	74	2	2	27										
21-Sep	8:5	1	1	20	1	1	62										BE; 1st yr. 12:25
23-Sep	7:5	4	1	28	7	9	91										BE; 13:03, 14:35 / Imm.
25-Sep	8:5	2	1	50	7	18	9										
26-Sep	4			6		1	8										
27-Sep	6			7		1	1										
28-Sep	1					1	1										
29-Sep	7	2		1		2	6										
30-Sep	5	1		3		1	5										
24	163	82	71	20	20	1880	40	0	2	5439	84	0	0	193	15	4	9 7859

Greater Toronto Raptor Watch

High Park, Fall 1996

Date	HR	TV	OS	BENH	SS	CHNG	RS	BW	RT	RL	GE	AK	ML	PG	UR	TT	COMMENTS
1-Oct	7:5	8			2				1							11	
2-Oct	1:5				1				1							2	
3-Oct	11	930	2	1	303	11	1	35	174							1604	BE; Imm 16:25
4-Oct	8	15			43	3	3		8							77	
5-Oct	5:5	7			3				2							13	
6-Oct	9				2											2	
8-Oct	9	6			23				2							33	
9-Oct	6				49			1								53	
10-Oct	9	228	1	1	323	13	11		44							656	
11-Oct	9	4		5	65	13	5		89							186	
12-Oct	2						1									2	
13-Oct	4	103			22				2							127	
14-Oct	11	437	1	8	549	34	58		371							1534	BE; 2nd yr 11:07 / RL; LM
15-Oct	8	75			6	4	1	5	35							2	RL; LM
18-Oct	5				14	4			1							19	
19-Oct	4	10			11	2	1		8							33	
20-Oct	6	1		1	11	2			5							20	
22-Oct	6	9			12	1	1		11							35	
24-Oct	3				2		1									3	
25-Oct	7	33			21	2	2		46							108	GE; Imm - 11:30, 12:59, 13:05, Adult - 13:05
26-Oct	7	17			9	4			20							54	
28-Oct	10	7			6	2	36		188							247	GE; Adult - 10:22, 11:55 Imm. - 11:48
29-Oct	7				1	1	6		34							42	
31-Oct	7:5					1	1		6							13	GE; Imm. - 12:10, 12:24
24	163	1890	4	2	15	1483	98	5	164	0	1040	5	9	174	19	1	93 5003

Greater Toronto Raptor Watch																			
High Park, Fall 1996																			
Date	HR	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	TT	COMMENTS
1-Nov	7						7	3	2	1	35	2						38	
2-Nov	8	9	1				7	2	49		262	1	3				22	359	GE: 11:50, 13:40, 13:56 - imm / OS: 9:40
3-Nov	8	1					3	2	7		64			1			2	80	
4-Nov	7	1					1				1							3	TV: Silver wing tag
5-Nov	4						1	1			16	2						20	
8-Nov	6						2				1	1						6	RL: Dark Morph
9-Nov	9						4	2	1	12	109	1				1		130	PG: was high and flying south west
10-Nov	8						3		4	2	51							61	BE: Adult 10:45
11-Nov	8							2	7		20	1						30	RL: Dark Morph
12-Nov	7	1					7	2	27		151	1						190	RL: Dark Morph
13-Nov	7	41					15	3	2	18	209	5	1				2	296	RL: 3 DM's together / GE: 11:13 unk.
14-Nov	85	2					1	2	1	12	93	2					1	115	RL: D.M. - 1, LM -2
15-Nov	4						1				2							3	
18-Nov	75	2						1			5						1	9	
19-Nov	7																	0	
20-Nov	8						1		1		10						2	15	BE: Imm. 11:15
22-Nov	7						1				4							5	
27-Nov	4										9							9	
17	125	57	1	2	2	46	17	11	137	0	1042	16	4	1	2	1	30	1369	
65	464	2029	76	24	37	3403	155	15	303	5439	2165	21	13	367	36	5	132	14220	

A Retrospective Report on the Cranberry Marsh Raptor Watch of 1996

By Doug Lockrey

The Cranberry Marsh Raptor Watch (CMRW), started its seventh season on September 1, 1996, we terminated operations on November 29, after 71 days of coverage. Observations and counting of migrating raptors were made from the platform at the southwest corner of the shallow marsh, which is separated from Lake Ontario by a willow-festooned barrier beach. Indeed, on several days this structure was over-crowded with people and their scopes. Twenty-nine individuals served as the primary counters/observers over the three-month period.

Somewhat northwesterly winds were rare, and only 4 days proved to yield "significant" numbers of migrants. To this end the site's waterfowl and shorebirds were greatly appreciated. Many conversations revolved around raptors whims and attempts to figure out their flights paths.

The table below is meant only to compare 1994 (our big year) with 1996 for a few species. In actual fact the 1996 totals were higher for 7 species, they being Osprey, Bald Eagle, Sharp-shinned Hawk, Cooper's Hawk, Northern Goshawk, Rough-legged Hawk and Golden Eagle.

Species	1994	1996
Total of all raptors	16,136	6,723 *
Turkey Vulture	1,869	1,652
Osprey	52	86 [24 on Sep. 15, 1996]
Bald Eagle	11	19
Northern Harrier	322	76
Sharp-shinned Hawk	1,296	1,363
Board-winged Hawk	11,303	2,423
Red-tailed Hawk	283	527

- 70% of the 6,723 birds were reported on just 4 of the 71 days monitored.

These were also the big days for 3 of the raptors.

Date	Sky	Wind Direction	Total	Broad-winged Hawk	Sharp-shinned Hawk	Turkey Vulture
Sep. 18	Cloudy	NW	1,937	1,530	253	
Sep. 19	Sunny	NNW	843	669	111	
Oct. 03	Sun/Cloud	NW/NE	901		157	518
Oct. 14	Sunny	NW	1,094		344	601

The numbers of migrants recorded per month were 3,478 for September, 2,996 for October and 249 for November. Poor weather in November was not conducive to volunteers coming out to stand on the platform, frustratingly hoping that more than the recorded 186 Red-tailed Hawks would fly over.

It is difficult to get weekday coverage. Although observers were present for 24 days (for 110 hrs.) in September, 27 days (116 hrs.) in October and 20 days (61 hrs.), on many weekdays there were rarely more than two people who stayed for more than 1 hour.

Those monitors who took on the responsibility of recording the hour-by-hour data did an excellent job, indeed, the submission of the Hawk Migration Association of North America (HMANA) pages on a regular basis was immense help to John Barker. This work and the need for more volunteers are essential for 1997.

A feature which was appreciated by visitors as well as counters/ observers was the availability of hand-out pages that showed silhouettes and explained flight habits of all of the raptors, along with bar-graphs which showed the period of time during which each species tend to be seen migrating.

We tend to trap ourselves into worrying about the 3 -month total count, in spite of being aware that the number is so dependent upon the numbers of Broad-winged Hawks that "elect" to fly over in mid-September. In fact, we did so enjoy the sudden appearance of low-flying Sharp-shinned Hawks, the counting of soaring Turkey Vultures, the 24 Ospreys on September 15(the total of 86 was the biggest since 1991), the anticipated calling out of "Eagle Time" to alert us to keep our eyes open for the majesty of Bald/Golden Eagles, the all-too-few swift Merlin's, the hopes to see a Gyrfalcon, etc.

In the category of " disappointments" might be the following: low over-all totals for Northern Harriers (76), Red-shouldered Hawks (7), Red-tailed Hawks (527), Rough-legged Hawks (21), American Kestrels (378) and Merlin's (17). During November there were only 4 SS, 1 TV, and 186 RT. After Nov. 3 there were never >10 RTs per day.

GREATER TORONTO RAPTOR WATCH									
Station: Cranberry Marsh Location: Whitby, Ontario, Canada									
Species/ Year	1990	1991	1992	1993	1994	1995	1996	90-96 Avg.	
Turkey Vulture	886	1,721	772	681	1,869	644	1,652	1,175	
Osprey	76	94	61	33	52	57	86	66	
Bald Eagle	15	20	12	13	11	27	19	17	
Northern Harrier	129	177	129	93	322	157	76	155	
Sharp-shinned Hawk	1,037	1,846	2,117	1,084	1,296	1,310	1,363	1,436	
Cooper's Hawk	66	164	132	59	31	57	42	79	
Northern Goshawk	36	37	33	11	9	49	13	27	
Red-shouldered Hawk	81	186	168	16	20	28	7	75	
Broad-winged Hawk	5,631	6,357	1,118	700	11,303	1,477	2,423	4,144	
Swainson's Hawk	0	0	0	0	0	1	0	NA	
Red-tailed Hawk	1,269	1,858	1,483	496	283	1,303	527	1,031	
Rough-legged Hawk	101	222	30	5	17	119	21	74	
Golden Eagle	19	13	8	5	4	21	9	11	
American Kestrel	410	1,086	758	269	661	479	378	577	
Merlin	21	74	40	17	31	50	17	36	
Peregrine Falcon	21	38	29	13	19	15	14	21	
Gyrfalcon	0	1	0	0	0	0	0	NA	
Unidentified Raptors	81	466	352	84	208	171	76	205	
Season Total	9,879	14,360	7,242	3,579	16,136	5,965	6,723	9,126	
Days	43	76	62	56	57	80	71	64	
Hours	200	426	321	182	255	388	287	240	
Birds/Hour	49.4	33.7	22.6	19.7	63.3	15.4	23.4	38	

Greater Toronto Raptor Watch

Cranberry Marsh, Fall 1996

Date	HR	TV	OS	BH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	TT	COMMENTS
1-Sep	6	4	2	17													23	
2-Sep	6	8	3	5												1	1	24 PG,R Leg-Red Band
3-Sep	3	3		4													7	
4-Sep	3			3													3	
5-Sep	4			5													7	
6-Sep	3	2	3	1													4	
7-Sep	2			1													3	
8-Sep	6	1	1	14													2	
9-Sep	5	4	1	2	1											1	2	32 BE; 1:50/ 2yr, UE; 12:40
10-Sep	5	1	5	1	17				199	5						1	4	237
11-Sep	2																3	
14-Sep	4	2		1												2	5	PG, Adult
15-Sep	8	24	1	31												1	60	
16-Sep	5	5	3	85					14	1						1	114	
17-Sep	6	5	2	1	17				5	2						2	37	BE; 10:38am - 12:15pm / adult
18-Sep	8	11	10	8	7	253	3		1,530	14						1	2	1937 BE; 11:19,11:22,11:30,12:27,12:43,13:20,16:00/ AD-3, Im-2, unk-2
19-Sep	5	18	2	1	111	10			669	3						2	843	
20-Sep	3			1												1	5	
21-Sep	3	1		3													4	
23-Sep	5	33	1	2	9	1			2	2						1	57	BE; 10:05, UE; 11:40am
24-Sep	1			1													2	
25-Sep	4	2	1	1	4	2				12						1	1	28 BE; 2yr - 10:20am
29-Sep	6	11		5													17	
30-Sep	7	5		14												1	24	
24	110	89	77	13	28	601	20	0	2419	45	0	0	152	8	8	18	3478	

Greater Toronto Raptor Watch

Cranberry Marsh, Fall 1996

Date	HR	TV	OS	BH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	TT	COMMENTS
1-Oct	3				2					1			3			1	7	
2-Oct	3			4	1									3	1	1	10	
3-Oct	8	518	2	11	157	6	4			36	1		153	2	2	9	901	
4-Oct	4	55		1	1	15	3	1	1	13	2					3	95	BE; 2yr-9:30
5-Oct	7	2	3	1	1	4				3			3	1	2	3	23	BE; 1st yr. - 9:58
6-Oct	6	4	1		1												6	BE; Ad. - 15:38 - E. Beagan etal Second Marsh
7-Oct	4	7		1	6					2			1				17	
8-Oct	3.5			1	2	1				1				1			6	
9-Oct	1				2									1			3	
10-Oct	5	48	1	3	72	3				3			12		1	4	147	
11-Oct	4.5	8	2	1	3	66				24			2				106	BE; Imm
12-Oct	3.5	110			5	1							1	1			118	
13-Oct	6	99	1		41								1			2	144	BE; 2yr. 10:31
14-Oct	10	601		10	344	1			2	84	1		39			12	1094	
15-Oct	5	77		1	8				1	15						102		
16-Oct	2.5									1							1	
17-Oct	1	2							1	2							5	
18-Oct	2			1	3	1				1							6	
20-Oct	4	4			5					9	2						20	SS; Adults
22-Oct	2	3			3					5							11	
25-Oct	4	10		1	4	1				15							31	
26-Oct	5	1		1	2	1				1	1	2	1			3	13	GE; 12:00 - Immatures
27-Oct	5				2							1					3	GE; 11:45 - UKN
28-Oct	6	6			8	1			1	32	1		3			4	57	RL; LM / RT; D Morph -1
29-Oct	5	7		4	5	2				42	1	1				1	63	GE; 13:50 - UKN
30-Oct	3																0	
31-Oct	3								6				1				7	
27	116	1562	8	5	43	758	18	8	3	4	296	9	4	220	9	6	43	2996

Greater Toronto Raptor Watch

Cranberry Marsh, Fall 1996

Date	HR	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	TT	COMMENTS
1-Nov	3												1					1	GE: Subadult 10:46
2-Nov	5	1			1	1	1	2	3		113	4		3			10	139	UE: 13:00
3-Nov	3.5			1	1	1	1				16			1			1	21	
4-Nov	3				1						5			1				7	NH, Male
5-Nov	3						1				5							6	
8-Nov	3																	0	
9-Nov	5		1		1	1		1	1		7						3	14	
10-Nov	4										5							8	
11-Nov	4				1	1			3		6	1						8	NH, Male
12-Nov	3										7		1				1	13	GE: 12:45 - imm.
13-Nov	4						1				3	2	3					8	GE: 11:05 - imm. 12:30 - 2- adults
15-Nov	3										7							8	
16-Nov	3										3							3	
17-Nov	2										2	1						0	
18-Nov	3										2							3	
20-Nov	2				1						3			1				3	
22-Nov	3																	4	
24-Nov	2																	0	
25-Nov	1										2							2	
29-Nov	1										1							1	RL: Juv. - LM - Standing on the Marsh Ice
20	61	1	1	1	5	4	4	5	4	0	186	12	5	6	0	0	15	249	
71	287	1652	86	19	76	1363	42	13	7	2423	527	21	9	378	17	14	76	6723	

OAK RIDGES MORaine HAWK MIGRATION

By Rayfield Pye

Goals of Project: The goal of this study was to see if migrating hawks were flying westward along the Oak Ridges Moraine.

Location: Long Sault Conservation Area, Clarlinton Township, Durham RM, Ontario

Species	TV	SS	RS	RT	AK	Unknown	Total
Oct. 5/96	6	13					19
Oct. 26/96	2		2	16	1	4	25
Nov. 2/96				1		4	5
Total	8	13	2	17	1	8	49

Day	Hours	Wind Direction	Flight Directions
Oct. 05/96	3.25	South	West, South
Oct. 26/96	3	South-east	West, South-west
Nov. 02/96	1.75	North	South

Conclusion: About half of the hawks were migrating westwards along the Oak Ridge Moraine. How many migrating hawks are using the Oak Ridges Moraine and bypassing the Lake Ontario watches are unknown. We need to do more studies on the moraine. On November 2 there was a Unidentified Eagle.

WEATHER ANALYSIS

Methodology

The purpose of this project was to determine the relationship between numbers of raptors observed, by species, during the fall migration at High Park, and a number of recorded weather elements. The project was conducted under the auspices of the Greater Toronto Raptor Watch and coincided with the High Park Raptor Watch between September 1st and November 30th, 1996.

The observation site was located at High Park, Toronto, Ontario at North 43 degrees, 38 minutes and 78 seconds and West 79 degrees, 27 minutes and 93 seconds. The site is situated on a small hill at 110 m. elevation, 34.8 m. above and about 1.25 kilometres north of Lake Ontario.

Observations were conducted daily, except for rainouts. Weather data was recorded hourly and visual estimates were taken on site for wind speed, wind direction and cloud cover. For wind speed four modes were recorded. For wind direction 8 modes were recorded. For cloud cover 6 modes were recorded. Estimates were made by the same observer in all cases. Readings for relative humidity and barometric pressure were obtained from Environment Canada at the Pearson International Airport weather station, a distance of about 14 kilometres northwest of High Park. Relative humidity and barometric pressure readings were subdivided into five categories. The raptor counts were recorded hourly and matched to the appropriate weather category. A total of 464 weather readings and hours of raptor observation was involved.

Raptor counts were broken down by weather category and by species and compared to the number of hours observed within that weather category. These counts were represented both numerically and as percentage of the total count. As five measurable weather elements were recorded in this analysis, this represents a multivariate study. However, the interaction of these related weather elements makes interpretation of the effect of only one or two elements extremely difficult. Other caveats include the following: possible insufficient sample size for certain species and weather modes, possible biases in observation due to more/less favourable viewing conditions under certain weather conditions, possible significant differences in relative humidity between High Park and the weather station at Pearson International Airport, and no record of whether the barometric pressure was rising, falling or steady.

Intrepretation of Results

The vast majority (91.3%) of raptors were recorded where the winds were from a northerly (NW, N, NE) component. This effect is even more marked when as it was represented by only 58.1% of the observation time.

Within species, the mode of wind direction seemed to have a strong influence on relative numbers observed. Between species, there was a wide variance (37.7 - 91.0%) noted when the wind direction was from the northwest. Strong winds tended to result in more raptors being recorded.

Cloud cover, taken in isolation as a weather component, did not appear to be a significant factor in influencing migration. In terms of relative observability however, raptors are often more easily seen under a sky with significant cloud cover than one with relatively little cloud cover.

In regards to relative humidity, within the mode of 56-70%, over 90% of Turkey Vultures and Red-tailed Hawks were observed. Could this be related to the fact that thermals would be more visible with the clouds that would tend to form at this humidity, thus facilitating the spotting of these raptors?

The component of Barometric Pressure appeared to be a limiting factor towards raptor migration, with the possible exception of Turkey Vulture, as the vast majority of migrants were observed within the pressure range of 101.00 - 101.99 kilopascals.

If one combines the effect of all these weather components with relative numbers of raptors observed, it appears that more raptors are observed under weather conditions associated with the passage of a cold front. Weather conditions generally associated in fall in Southern Ontario with passage of such a front included moderate to strong winds from a northerly direction and high and/or rising pressure. Whether more raptors actually move in a broad front or are just more viewable or appear in larger numbers under these conditions has yet to be proven at this site.

This study has provided initial information on the weather related flight profiles for each observed raptor species and for raptors in general. More years of data collection is needed, hopefully with the possible caveats addressed and biases eliminated. Only then can statistically significant conclusions can be made on the relative weather effects on raptor migration in High Park.

Greater Toronto Raptor Watch

Weather, Fall 1996

Weather taken from the Toronto International Airport

Source: Toronto Star Newspaper daily forecasts prepared by MTI Inc.

Date	Weather	Temperature	Humidity	Wind	W. Speed	Baro. Pr.	Precip.
Day	8:00 to	Centigrade	%	8:00 to	Km/h	kpa	mm
Month	17:00	L / H	am / pm	17:00	am / pm	See PG.2	T= Trace
1-Sep	Sunny	16 to 26	90 to 52	Variable	00 to 07	101.94	0
2-Sep	Sunny	16 to 27	89 to 74	Calm	Calm	101.84	0
3-Sep	Sunny	17 to 28	88 to 40	South	00 to 09	101.8	0
4-Sep	P. Cloudy	17 to 26	84 to 51	Variable	09 to 17	101.75	0
5-Sep	Variable	17 to 27	83 to 56	Variable	07 to 17	102	0
6-Sep	Cloudy	20 to 27	83 to 56	East	06 to 30	102	0
7-Sep	Rain	19 to 20	92 to 97	ENE	31 to 45		27.8
8-Sep	Cloudy	18 to 20	94 to 83	Variable	19 to 22	100.91	50.6
9-Sep	Variable	16 to 19	92 to 95	Variable	04 to 09		1.4
10-Sep	P. Cloudy	17 to 24	95 to 64	North	17 to 13	101.7	1.8
11-Sep	Sunny	15 to 24	94 to 78	South	09 to 17	101.65	0
14-Sep	Cloudy	12 to 14	87 to 83	Variable	13 to 15	100.5	16.4
15-Sep	Cloudy	13 to 17	92 to 75	Variable	20 to 13	100.7	5.4
16-Sep	Cloudy	14 to 18	89 to 71	Variable	07 to 17	101.26	0.4
17-Sep	Cloudy	14 to 19	85 to 69	NNE	20 to 28	101.4	0
18-Sep	Cloudy	14 to 19	85 to 69	NNE	20 to 28	101.6	0
19-Sep	Sunny	11 to 22	67 to 33	NNW	20 to 28	101.86	0
20-Sep	Sunny	10 to 24	84 to 34	Variable	00 to 07	101.67	0
21-Sep	P. Cloudy	10 to 21	90 to 54	ESE	00 to 06	101.45	0
23-Sep	Sunny	07 to 17	81 to 42	NNW	13 to 07	101.25	3.4
24-Sep	Showers	09 to 11	88 to 98	NNW	07 to 09		14.8
25-Sep	Cloudy	10 to 15	93 to 55	Variable	20 to 02	101.92	2.4
26-Sep	Variable	08 to 16	90 to 67	ESE	04 to 26		0
27-Sep	Rain	16 to 19	90 to 91	Variable	19 to 22		7
28-Sep	Variable	13 to 14	92 to 82	Variable	11 to 13		19.6
29-Sep	Cloudy	10 to 16	89 to 55	SW	11 to 28	101.54	T
30-Sep	Variable	05 to 12	88 to 58	Variable	04 to 20		0.4
1-Oct	Sunny	12 to 21	94 to 62	Variable	00 to 15	102.18	0
2-Oct	Cloudy	17 to 22	80 to 60	SSW	19 to 30	101.72	0
3-Oct	Variable	03 to 08	71 to 39	Variable	13 to 30	103.06	2
4-Oct	Sunny	01 to 09	86 to 56	Variable	06 to 13	103.06	0
5-Oct	Sunny	03 to 12	86 to 45	Variable	07 to 17	103.59	0
6-Oct	Sunny	08 to 19	77 to 48	S	04 to 20	102.7	0
7-Oct	Cloudy	12 to 16	90 to 75	Variable	04 to 19		0
8-Oct	Cloudy	09 to 11	100 to 87	Variable	15 to 07	101.5	0.4
9-Oct	Showers	9	87	NNW	09 to 13	100.95	2.6
10-Oct	Cloudy	06 to 07	89 to 72	NNW	19 to 30	101.5	12.8

Date	Weather	Temperature	Humidity	Wind	W. Speed	Baro. Pr.	Precip.
Day	8:00 to	Centigrade	%	8:00 to	Km/h	kpa	mm
Month	17:00	L / H	am / pm	17:00	am / pm	See PG.2	T= Trace
11-Oct	Cloudy	02 to 09	68 to 58	SW	04 to 11	102.79	0
12-Oct	Cloudy	06 to 14	81 to 69	SSW	09 to 20	101.5	0
13-Oct	Variable	10 to 21	88 to 56	SW	07 to 26	101.6	0
14-Oct	Sunny	07 to 09	82 to 56	NNW	07 to 35	102.1	2.4
15-Oct	Sunny	M1 to 07	87 to 68	Variable	04 to 11	102.7	0
16-Oct	Cloudy	08 to 18	86 to 74	Variable	00 to 11		T
17-Oct	Variable	12	100 to 89	E	00 to 22	101.5	6.8
18-Oct	Variable	10 to 09	100 to 93	Variable	24 to 28	100.61	2.4
19-Oct	Rain	07 to 09	82 to 94	Variable	24 to 15	101.5	24.4
20-Oct	Cloudy	10 to 11	70 to 90	Variable	20 to 24	101.2	12.8
22-Oct	Cloudy	07 to 11	87 to 71	Variable	04 to 07		T
24-Oct	Variable	06 to 10	83 to 86	SW	15 to 22	100.5	1
25-Oct	Sunny	04 to 13	90 to 59	Variable	13 to 11	102.06	0.3
26-Oct	Sunny	05 to 13	95 to 71	Variable	04 to 06	102.8	0
27-Oct	Variable	09 to 17	89 to 92	Variable	00 to 19	102.5	T
28-Oct	Variable	11 to 09	72 to 52	WNW	17 to 28	101.53	0.2
29-Oct	Sunny	01 to 10	93 to 53	Variable	04 to 11	101.67	0
30-Oct	Variable	10 to 13	92 to 79	Variable	15 to 52		9
31-Oct	Variable	01 to 03	72 to 53	Variable	20 to 59		T
1-Nov	Cloudy	M1 to 01	71 to 79	Variable	26 to 19	101.2	T
2-Nov	Variable	M1 to M5	85 to 60	W	13 to 22	101.03	T
3-Nov	P. Cloudy	00 to 04	93 to 65	W	20 to 33	103.1	0.4
4-Nov	Sunny	01 to 10	59 to 46	Variable	11 to 28	102.35	0
5-Nov	Cloudy	06 to 07	87 to 81	ESE	02 to 06	100.5	1.2
8-Nov	Cloudy	06 to 07	88 to 83	NW	20 to 11	100.75	9.8
9-Nov	Cloudy	03 to 06	88 to 65	NW	07 to 12	100.48	0
10-Nov	Cloudy	M3 to M5	72 to 49	Variable	00 to 15	101.29	0
11-Nov	Variable	M2 to 01	80 to 81	W	11 to 15	101.9	T
12-Nov	Variable	M3 to M1	86 to 58	Variable	09 to 19		0.4
13-Nov	Variable	M5 to 00	83 to 49	Variable	11 to 07		T
14-Nov	Sunny	M6 to M1	83 to 58	Variable	07 to 15		0
15-Nov	Variable	M8 to M2	81 to 68	Variable	11 to 22		0
16-Nov	Sunny	M1 to 05	82 to 60	Variable	07 to 17		0
17-Nov	Cloudy	M3 to M2	95 to 51	Variable	04 to 15		0
18-Nov	P. Cloudy	02 to 05	94 to 76	Variable	17 to 04		1.4
19-Nov	Cloudy	03 to 01	85 to 68	W	11 to 28		T
20-Nov	Variable	M4 to 01	85 to 62	NW	15 to 20		0.2
22-Nov	Variable	00 to 03	91 to 80	Variable	15 to 19		T
24-Nov	Cloudy	M8 to M4	61 to 86	NE	17 to 13		1
25-Nov	Cloudy	M4 to M1	83 to 64	Variable	07 to 09		1.6
27-Nov	Variable	M8 to M3	82 to 48	NNW	13 to 06		T
29-Nov	Cloudy	M2 to 03	78 to 69	Variable	09 to 11		0

Barometric Pressure taken from Norm Murrs Raptor Report supplied by Don Barnett.
This is an average reading based on what was taken by the Hour.

HIGH PARK

COMPARISON OF NUMBERS OF RAPTORS,

BY SPECIES, WITH A VARIETY OF

WEATHER ELEMENTS

BY DONALD W. BARNETT

SUMMARY TABLE OF RAPTORS RELATED TO WEATHER CONDITIONS

WIND SPEED

Light	Medium	Strong	Very Strong
179 Hours	161 Hours	116 Hours	8 Hours
38.6 %	34.7 %	25.0 %	1.7 %

WIND DIRECTION FROM

N	NW	W	NE	SW	S	SE	E
47 Hours	195 Hours	16 Hours	28 Hours	94 Hours	26 Hours	36 Hours	22 Hours
10.1 %	42.0 %	3.4 %	6.0 %	20.3 %	5.6 %	7.8 %	4.7 %

Cloud Cover %

0 - 9	10 - 19	20 - 39	40 - 59	60 - 79	80 - 100
75 Hours	26 Hours	47 Hours	82 Hours	31 Hours	203 Hours
16.2 %	5.6 %	10.1 %	17.7 %	6.7 %	43.8 %

Relative Humidity

26 - 40 %	41 - 55 %	56 - 70 %	71 - 85 %	86 - 100 %
< 1 Hour	31 Hours	165 Hours	139 Hours	129 Hours
< 0.2 %	6.7 %	35.6 %	30.0 %	27.8 %

Barometric Pressure - Kilopascals

100 - 100.99	101.0 - 101.99	102.0 - 102.99	103.0 - 103.99
70 Hours	285 Hours	82 Hours	27 Hours
15.1 %	61.4 %	17.7 %	5.8 %

GREATER TORONTO RAPTOR WATCH

SUMMARY OF RAPTORS OBSERVED AT HIGH PARK, CATEGORIZED BY SELECTED SIGNIFICANT WEATHER ELEMENTS

Prepared by Donald W. Barnett Entered by John Barker

Note: Unidentified Raptors not included

Wind Direction From

Species	N	NW	NE	W	SW	S	SE	E	TOTAL
TV	145	1,618	57	0	180	8	21	0	2029
OS	7	30	1	5	9	14	9	1	76
BE	5	14	2	0	2	1	0	0	24
NH	5	19	6	0	6	1	0	0	37
SS	556	1,984	431	11	178	160	63	20	3403
CH	8	86	17	3	28	5	6	2	155
NG	1	10	1	0	1	2	0	0	15
RS	3	276	1	3	6	1	8	5	303
BW	3,138	2,048	163	0	7	72	9	2	5,439
RT	21	1,790	23	26	214	3	63	25	2165
RL	0	16	0	0	2	0	2	1	21
GE	0	7	0	0	6	0	0	0	13
AK	28	276	39	0	7	12	4	1	367
ML	2	23	4	1	4	1	0	1	36
PG	0	3	1	0	0	1	0	0	5
Total	3919	8,200	746	49	650	281	185	58	14088
% of Total	27.8	58.2	5.3	0.3	4.6	1.8	1.3	0.4	

GREATER TORONTO RAPTOR WATCH

SUMMARY OF RAPTORS OBSERVED AT HIGH PARK, CATEGORIZED BY SELECTED SIGNIFICANT WEATHER ELEMENTS

Prepared by Donald W. Barnett Entered by John Barker

Note: Unidentified Raptors not included

BAROMETRIC PRESSURE - KILOPASCALS

Kpa	100	101	102	103	Total
Species	100.99	101.99	102.99	103.99	
TV	0	500	635	894	2029
OS	11	59	3	3	76
BE	0	22	1	1	2105
NH	1	23	13	0	37
SS	125	2,570	371	337	3403
CH	9	85	51	10	155
NG	2	11	1	1	15
RS	13	177	75	38	303
BW	1	5,438	0	0	5439
RT	127	1,216	640	182	2165
RL	1	16	4	0	21
GE	0	9	4	0	13
AK	0	219	58	90	367
ML	5	22	8	1	36
PG	1	3	0	1	5
Total	296	10370	1864	1558	14088
% of Total	2.1	74.3	13.3	11.2	

WIND SPEED - KILOMETRES PER HOUR

Strength Km/h	L 00 to 07	M 08 to 12	S 13 to 24	VS 25 plus	Total
TV	139	359	1,531		2029
OS	21	41	14		76
BE	5	10	9		24
NH	8	11	18		37
SS	842	999	1,562	1	3403
CH	46	60	48		155
NG	1	11	3		15
RS	8	99	184	12	303
BW	1,563	2,093	1,783	6	5,439
RT	154	932	1,073	2	2165
RL	1	15	5		21
GE	2	3	6		13
AK	37	114	216		367
ML	16	11	9		36
PG	1	2	2		5
Total	2844	4760	6,463	21	14088
% of Total	20.2	33.8	45.9	0.1	

GREATER TORONTO RAPTOR WATCH

SUMMARY OF RAPTORS OBSERVED AT HIGH PARK, CATEGORIZED BY SELECTED SIGNIFICANT WEATHER ELEMENTS

Prepared by Donald W. Barnett Entered by John Barker

Note: Unidentified Raptors not included

CLOUD COVER						
Each column has the total number of hawks observed						
%	00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
Total						
Species						
TV	795		80	11	880	263
OS	7	1	16	4	6	42
BE	5		3		11	5
NH	1	1	1	1	12	21
SS	1,284	108	171	420	382	1,038
CH	44	3	6	15	6	81
NG			3	4	1	7
RS	65	3	9	68	96	62
BW	3,109	40	135	866	1,255	34
RT	548	10	59	640	480	428
RL	1	1		3	9	7
GE	4			3		6
AK	68	12	21	26	172	68
ML	6	2	1	1	3	23
PG	1			2	1	1
Total	5938	181	505	2064	3314	2086
% of Total	42	1.2	3.5	15	23	15

GREATER TORONTO RAPTOR WATCH

SUMMARY OF RAPTORS OBSERVED AT HIGH PARK, CATEGORIZED BY SELECTED SIGNIFICANT WEATHER ELEMENTS

Prepared by Donald W. Barnett Entered by John Barker

Note: Unidentified Raptors not included

RELATIVE HUMIDITY

Each column has the total number of hawks observed

%	26 to 40	41 to 55	56 to 70	71 to 85	86 to 100	Total
Species						
TV		29	1,938	51	11	2029
OS		3	10	56	7	76
BE		2	8	14		24
NH		1	20	16		37
SS	9	506	2,182	566	140	3403
CH		10	97	29	19	155
NG		9	2	2	2	15
RS	3	43	236	21		303
BW		1,683	1,413	2,340	3	5439
RT		90	1,985	61	29	2165
RL			2	16	3	21
GE			6	7		13
AK		92	117	142	16	367
ML		1	11	20	4	36
PG		2	3			5
Total	12	2471	8,030	3341	234	14088
% of Total	0.08	18	57	24	1.7	

Key to the Interpretation of Species Tables

1st row of table - Component of Weather Variable

2nd row of table - Numbers of raptors of that species observed within that weather component

3rd row of table - Percentage of raptors of that species observed within that weather component

4th row of table - Percentage of hours of observation within that weather component

Boldface percentages - Indicates where the percentage of raptors observed significant exceeds the hours of observation within that weather component

Species: Turkey Vulture

Total Birds: 2,029

Wind Speed

Light	Medium	Strong	Very Strong
139	359	1,531	
6.9 %	17.7 %	75.5 %	
38.6 % HRS	34.7 % HRS	25 % HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
145	1,618		57	180	8	21	
7.1 %	80.8 %		2.8 %	8.8 %	0.4 %	1.0 %	
10.1 %	42 %	3.4 %	6.0 %	20.3 %	5.6 %	7.8 %	4.7 %
HRS	HRS	HRS	HRS	HRS	HRS	HRS	HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
795		80	11	880	263
39.2 %		3.9 %	0.5 %	43.4 %	13 %
16.2 % HRS	5.6 % HRS	10.1 % HRS	17.7 % HRS	6.7 % HRS	43.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
	29	1,938	51	11
	1.4 %	95.5 %	12.4 %	2.51 %
0.2 % HRS	6.7 % HRS	35.6 % HRS	30 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
		500	635	894
		24.6 %	31.3 %	44.1 %
	15.1 % HRS	61.4 % HRS	17.7 % HRS	5.8 % HRS

Species: Osprey

Total Birds: 76

Wind Speed

Light	Medium	Strong	Very Strong
21	41	14	
27.6%	54%	18.4%	
38.6% HRS	34.7% HRS	25% HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
7	30	5	1	9	14	9	1
9.2%	39.5%	6.6%	1.3%	11.9%	18.4%	11.8 %	1.3%
10.1% HRS	42% HRS	3.4% HRS	6% HRS	20.3% HRS	5.6% HRS	7.8% HRS	4.7% HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
7	1	16	4	6	42
9.2%	1.3%	21.1%	5.3%	7.8%	55.3%
16.2% HRS	5.6% HRS	10.1% HRS	17.7% HRS	6.7 % HRS	48.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100%
	3	10	56	7
	4 %	13.2 %	73.7 %	9.2%
0.2 % HRS	6.7% HRS	35.6 HRS	30 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.9	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
	11	59	3	3
	14.5%	77.6%	4%	4%
	15.1 % HRS	61.4 % HRS	17.4 % HRS	5.8% HRS

Species: Bald Eagle

Total Birds: 24

Wind Speed

Light	Medium	Strong	Very Strong
5	10	9	
20.8%	41.6%	37.6%	
38.6% HRS	34.7% HRS	25.0% HRS	1.7% HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
5	14		2	2	1		
20.8%	58.3%		8.3%	8.3%	4.2%		
10.1% HRS	42.0% HRS	3.4% HRS	6.0% HRS	20.3% HRS	5.6 % HRS	7.8% HRS	4.7% HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
5		3		11	5
20.8%		12.5%		45.8%	20.8%
16.2% HRS	5.6% HRS	10.1% HRS	17.7% HRS	6.7% HRS	43.8% HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70%	71 to 85%	86 to 100%
	2	8	14	
	8.3%	33.3%	58.3%	
0.2% HRS	6.7% HRS	35.6% HRS	30.0% HRS	27.8% HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 - 101.99	102.0 to 102.99	103.0 to 103.99
		22	1	1
		91.7%	4.2%	4.2%
	15.1% HRS	61.4% HRS	17.7% HRS	5.8% HRS

Species: Northern Harrier

Total Birds: 37

Wind Speed

Light	Medium	Strong	Very Strong
8	11	18	
21.6%	29.7%	48.6%	
38.6% HRS	34.7% HRS	25.00 % HRS	1.7% HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
5	19		6	6	1		
13.5 %	51.4%		16.2%	16.2 %	2.7%		
10.1 %	42.0%	3.4 %	6.0% HRS	20.3% HRS	5.6 %	7.8% HRS	4.7% HRS
HRS	HRS	HRS			HRS		

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
1	1	1	1	12	21
2.7%	2.7%	2.7%	2.7%	32.4%	56.8%
16.2% HRS	5.6% HRS	10.1% HRS	17.7% HRS	6.7% HRS	43.8% HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100%
	1	20	16	
	2.7 %	59.5 %	43.2 %	
0.2 % HRS	6.7 % HRS	35.6 % HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
	1	23	13	
	2.7 %	62.2 %	35.1%	
	15.1 % HRS	61.4 % HRS	17.7 % HRS	5.8% HRS

Species: Sharp-shinned Hawk

Total Birds: 3,403

Wind Speed

Light	Medium	Strong	Very Strong
842	999	1,562	
24.7 %	29.4 %	45.9 %	
38.6 % HRS	34.7 % HRS	35.00 % HRS	1.7% HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
556	1,984	11	431	178	160	63	20
16.3%	58.3%	0.3%	12.7%	5.2%	4.7%	1.9%	0.6%
10.1% HRS	42.0% HRS	3.4% HRS	6.0% HRS	20.3% HRS	5.6% HRS	7.8% HRS	4.7% HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
1,284	108	171	420	382	1,038
36.1%	3.2%	5.2%	12.3%	11.2%	30.5%
16.2% HRS	5.6% HRS	10.1% HRS	17.7% HRS	6.7% HRS	43.8% HRS

Relative Humidity

26 to 40%	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
9	506	2,182	566	140
0.3 %	14.9 %	64.1%	16.6%	4.1%
0.2 % HRS	6.7% HRS	35.6% HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
	125	2,790	371	337
	3.7 %	82.0 %	10.9 %	9.9 %
	15.1 % HRS	61.4 % HRS	17.7 % HRS	5.8% HRS

Species: Cooper's Hawk

Total Birds: 155

Wind Speed

Light	Medium	Strong	Very Strong
46	60	48	1
29.0 %	38.7 %	31.0 %	0.6 %
38.6 % HRS	34.7 % HRS	25.0 %HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
8	86	3	17	28	5	6	2
5.2 %	55.5 %	1.9 %	11.0 %	18.1 %	3.2 %	3.9 %	1.3 %
10.1 % HRS	42.0 % HRS	3.4 % HRS	6.0 % HRS	20.3 % HRS	5.6 % HRS	7.8 % HRS	4.7 % HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
44	3	6	15	6	81
28.4 %	1.9 %	3.9 %	9.7 %	3.9 %	52.2 %
16.2 % HRS	5.6 % HRS	10.1 % HRS	17.7 % HRS	6.7 % HRS	43.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
	10	97	29	19
	6.5 %	62.6 %	18.7 %	12.3 %
0.2 % HRS	6.7 % HRS	35.6 % HRS	30.0 % HRS	27.8 %HRS

Barometric Pressure - Kilopascals

99.0 to 99.9	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
	9	85	51	10
	5.8 %	54.8 %	32.9 %	6.5 %
	15.1 % HRS	61.4 % HRS	17.7 % HRS	5.8 % HRS

Species: Northern Goshawk

Total Birds: 15

Wind Speed

Light	Medium	Strong	Very Strong
1	11	3	
7.0 %	73.0 %	20.0 %	
38.6 % HRS	34.7 % HRS	25.0 % HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
1	10		1	1	2		
7.0 %	66.6 %		7.0 %	7.0 %	14.0 %		
10.1 % HRS	42.0 % HRS	3.4 % HRS	6.0 % HRS	20.3 % HRS	5.6 % HRS	7.8 % HRS	4.7 % HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
		3	4	1	7
		20.0 %	26.0 %	7.0 %	47.0 %
16.2 % HRS	5.6 % HRS	10.1 % HRS	17.7 % HRS	6.7 % HRS	43.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
	9	2	2	2
	60.0 %	13.0 %	13.0 %	13.0 %
0.2 % HRS	6.7 % HRS	35.6 % HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
	2	11	1	1
	13.0 %	73.0 %	7.0 %	7.0 %
	15.1 % HRS	61.4 % HRS	17.7 % HRS	5.8 % HRS

Species: Red-shouldered Hawk

Total Birds: 303

Wind Speed

Light	Medium	Strong	Very Strong
8	99	184	12
2.6 %	32.7 %	60.7 %	3.9 %
38.6 % HRS	34.7% HRS	25.0 % HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
3	276	3	1	6	1	8	5
1.0 %	91.0 %	1.0%	1.0%	2.0 %	1.0 %	2.6 %	1.7%
10.1% HRS	42.0 % HRS	3.4% HRS	6.0 % HRS	20.3% HRS	5.6 % HRS	7.8 % HRS	4.7 % HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
65	3	9	68	96	62
21.5 %	1.0 %	3.0 %	22.4 %	31.7 %	20.5 %
16.2 % HRS	5.6 % HRS	10.1 % HRS	17.7 % HRS	6.7 % HRS	43.8% HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
3	43	236	21	
1.0 %	14.2 %	78.9 %	6.9 %	
0.2 % HRS	6.7 % HRS	35.6 % HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
	13	177	75	38
	4.3 %	58.4%	24.8 %	12.5%
	15.1 % HRS	61.4 % HRS	17.7 % HRS	5.8 % HRS

Species: Broad-winged Hawk

Total Birds: 5,439

Wind Speed

Light	Medium	Strong	Very Strong
1,563	2,093	1,783	
28.7 %	38.5 %	32.8 %	
38.6 % HRS	34.7 % HRS	25.0 % HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
3,138	2,048		163	7	72	9	2
57.7 %	37.7%		3.0%	0.1%	1.3%	0.1%	0.003%
10.1% HRS	37.7 % HRS	3.4 % HRS	6.0% HRS	20.3 % HRS	5.6% HRS	7.8% HRS	4.7% HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
3,109	40	135	866	1,255	34
57.2 %	0.7%	2.5 %	15.9%	23.1%	0.6%
16.2 % HRS	5.6 % HRS	10.1% HRS	17.7% HRS	6.7% HRS	43.8% HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
	1,683	1,413	2,340	3
	30.9 %	26.0 %	43.1 %	0.001%
0.2% HRS	6.7% HRS	35.6 % HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.9	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
	1	5,438		
	0.01 %	99.99 %		
	15.1 % HRS	61.4% HRS	17.7 % HRS	5.8 % HRS

Species: Red-tailed Hawk

Total Birds: 2,165

Wind Speed

Light	Medium	Strong	Very Strong
154	932	1,073	6
7.1%	43.0%	49.6%	0.3%
38.6 % HRS	34.7% HRS	25.0 % HRS	1.7 % HRS

N	NW	W	NE	SW	S	SE	E
21	1,801	26	23	214	3	63	25
1.0%	83.2 %	1.2%	1.1%	9.9 %	0.01%	2.9%	1.2%
10.1% HRS	42.0 % HRS	3.4 % HRS	6.0 % HRS	20.3% HRS	5.6 % HRS	7.8 % HRS	4.7% HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59 %	60 to 79	80 to 100
548	10	59	640	480	428
25.3 %	0.5 %	2.7 %	29.6 %	22.3%	19.8 %
16.2 % HRS	5.6 % HRS	10.1 % HRS	17.7 % HRS	6.7 % HRS	43.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
90	1,985	61	29	
4.2%	91.7 %	2.8 %	1.3 %	
0.2 % HRS	6.7% HRS	35.6 % HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.9	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
127	1,216	640	182	
5.9 %	56.2 %	29.6 %	8.4 %	
15.1 % HRS	61.4% HRS	17.7 % HRS	5.8% HRS	

Species: Rough-Legged Hawk

Total Birds: 21

Wind Speed

Light	Medium	Strong	Very Strong
1	15	5	
4.8%	71.4%	23.8%	
38.6 %	34.7 %	25.0 %	1.7 %

Wind Direction From

N	NW	W	NE	SW	S	SE	E
	16			2		2	1
	76.2 %			9.5 %		9.5 %	4.8%
10.1% HRS	42.0 % HRS	3.4 % HRS	6.0 % HRS	20.3% HRS	5.6% HRS	7.8 % HRS	4.7% HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
1	1		3	9	7
4.8 %	4.8 %		14.3 %	42.9%	33.3 %
16.2% HRS	5.6 % HRS	10.1 % HRS	17.7% HRS	6.7 % HRS	43.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
		2	16	3
		10.5 %	76.2%	14.3 %
0.2 % HRS	6.7 % HRS	35.6 % HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
1	16	4		
4.8%	76.2%	19.0%		
15.1% HRS	61.4% HRS	17.7 % HRS	5.8% HRS	

Species: Golden Eagle

Total Birds: 13

Wind Speed

Light	Medium	Strong	Very Strong
2	3	6	2
15.4%	23.0 %	46.0 %	15.4 %
38.6% HRS	34.7% HRS	25.0 % HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
	7			6			
	53.4 %			46.6%			
10.1% HRS	42.0 % HRS	3.4 % HRS	6.0 % HRS	20.3 % HRS	5.6 % HRS	7.8 % HRS	4.7 % HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
4			3		6
30.8 %			23.2 %		46.0 %
16.2 % HRS	5.6 % HRS	10.1 % HRS	17.7 % HRS	6.7 % HRS	43.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
		6	7	
		46.6 %	53.4 %	
0.2 % HRS	6.7 % HRS	35.6 % HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
		9	4	
		69.2 %	30.8 %	
	15.1 % HRS	61.4 % HRS	17.7% HRS	5.8 % HRS

Species: American Kestrel

Total Birds: 367

Wind Speed

Light	Medium	Strong	Very Strong
37	114	216	
10.0 %	31.1 %	58.8 %	
38.6 % HRS	34.7% HRS	25.0 % HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
28	276		39	7	12	4	1
7.6 %	75.2 %		10.6 %	0.2 %	0.3 %	0.1%	0.03 %
10.1% HRS	42.0 % HRS	3.4 % HRS	6.0 % HRS	20.3 % HRS	5.6 % HRS	7.8% HRS	4.7% HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
68	12	21	26	172	68
18.5 %	0.3%	0.6 %	0.7 %	46.9 %	18.5 %
16.2 % HRS	5.6 % HRS	10.1 % HRS	17.7 % HRS	6.7 % HRS	43.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
	92	117	142	16
	25.1 %	31.8 %	38.7 %	4.4 %
0.2 % HRS	6.7 % HRS	35.6 % HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
		219	58	90
		59.7 %	15.8 %	24.5%
	15.1 % HRS	61.4 % HRS	17.7 % HRS	5.8 % HRS

Species: Merlin

Total Birds: 36

Wind Speed

Light	Medium	Strong	Very Strong
16	11	9	
44.4 %	30.6 %	25.0 %	
38.6 % HRS	34.7 % HRS	25.0 % HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
2	23	1	4	4	1		1
5.6%	63.9%	2.8%	11.1%	11.1%	2.8%		2.8%
10.1% HRS	42.0% HRS	3.4% HRS	6.0% HRS	20.3 % HRS	5.6 % HRS	7.8% HRS	4.7 % HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
6	2	1	1	3	23
16.7 %	5.6%	2.8%	2.8%	8.3%	63.9 %
16.2 % HRS	5.6 % HRS	10.1% HRS	17.7 % HRS	6.7% HRS	43.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100%
	1	11	20	4
	2.8%	30.6 %	55.6 %	11.1%
0.2 % HRS	6.7% HRS	35.6% HRS	30.0 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
	5	22	8	1
	13.9%	61.1%	22.2%	2.8%
	15.1% HRS	61.4 % HRS	17.7 % HRS	5.8% HRS

Species: Peregrine Falcon

Total Birds: 5

Wind Speed

Light	Medium	Strong	Very Strong
1	2	2	
20.0 %	40.0 %	40.0 %	
38.6 % HRS	34.7 % HRS	25.0 % HRS	1.7 % HRS

Wind Direction From

N	NW	W	NE	SW	S	SE	E
	3		1		1		
	60%		20 %		20%		
10.1% HRS	42.0 HRS	3.4 % HRS	6.0 % HRS	20.3 % HRS	5.6 % HRS	7.8 % HRS	4.7% HRS

Cloud Cover %

00 to 09	10 to 19	20 to 39	40 to 59	60 to 79	80 to 100
1			2	1	1
20 %			40 %	20 %	20 %
16.2 % HRS	5.6 % HRS	10.1% HRS	17.7 % HRS	6.7 % HRS	43.8 % HRS

Relative Humidity

26 to 40 %	41 to 55 %	56 to 70 %	71 to 85 %	86 to 100 %
	2	3		
	40 %	60 %		
0.2 % HRS	6.7 % HRS	35.6 % HRS	30 % HRS	27.8 % HRS

Barometric Pressure - Kilopascals

99.0 to 99.99	100.0 to 100.99	101.0 to 101.99	102.0 to 102.99	103.0 to 103.99
	1	3		1
	20 %	60 %		20 %
	15.1 % HRS	61.4 % HRS	17.7 % HRS	5.8 % HRS