

Bird Monitoring
in the Vermilion Lakes Wetland

Banff National Park
2004

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Introduction

The Vermilion Lakes consists of three major and numerous minor flood plain lakes along the course of the Bow River in Banff National Park. (Bow Valley Naturalists, 1978). They are in the Montane Ecoregion and occupy an area between the river and the slopes of Mt. Norquay a short distance upstream from the Town of Banff. In the Banff National Park Management Plan they are identified as an Environmentally Sensitive Site.

In the fall of the year 2000, the Canadian Pacific Railway (CPR) installed a series of culverts through the ballast along the rail line which traverses the southern edge of the Vermilion Lakes. The project was intended to address operational and safety concerns on the part of the CPR as well as to meet a strategic goal identified in the Banff National Park Management Plan: "*To restore natural water levels and flows in the Vermilion Lakes*". (p. 25, 3.14.1)

As part of a program to monitor the effects of the project, we were contracted in 2001 to undertake bird surveys at 8 point count locations in the Vermilion Lakes Wetland where water levels were expected to change. These locations are west of Second Lake and west of Third Lake. They are sites at which, as part of a larger bird monitoring study in the Bow Valley, we had conducted surveys in each of the five years from 1995 to 1999. We have been contracted to repeat these surveys at the Vermilion Lakes each year since 2001.

Five of the sites are in wet willow habitats (including two in spruce/willows) on the north side of the railway tracks while the other three are in willow/poplar habitats south of the tracks. It was anticipated that the primary movement of water as a result of the culvert project would be from the north side of the tracks to the south until levels equalize.

Point counts were done twice at each location in June with the surveys thirteen days apart. We present results in the form of tables showing species and numbers of individual birds for each visit to each site. Brief, very general habitat descriptions for each site also are presented. And we have included tables showing the average numbers of species and individuals recorded in the five years prior to the project at each point as well as the numbers recorded in each of the four years since the culverts were installed.

Methods and Selection of Sites

The eight survey sites were selected initially as part of a representative sample of a variety of habitats in the montane ecoregion of the Bow Valley for the purposes of long term monitoring. They offer the best opportunity to compare pre-and-post-project occurrence of birds in the Vermilion Lakes Wetland given that recent years' data are available. The same point count methods were employed as in the previous surveys.

Point counts have been adopted as a standard method for bird monitoring (Ralph et al, 1993). The version of point counts employed for these surveys was modeled on the Forest Bird Monitoring Program which has been on-going in Ontario since 1987 (Cadman, 1994). By situating each survey site in the midst of a specific habitat or forest type, it is possible to derive data on bird populations that is habitat related.

Each point was surveyed for ten minutes on two occasions, approximately two weeks apart, in June. Surveys were conducted between 5:00 and 9:00 a.m. which is the optimal time for doing a bird census during the breeding season at this latitude (Ralph et al, 1993) and only when appropriate weather conditions prevailed. All birds heard or seen were recorded as to species and number and as inside or outside a 50 m. diameter circle around the point. Birds flying overhead were recorded as outside the 50 m. circle. For more details on methods see McIvor and McIvor (1995).

Results and Discussion

Tables are presented for each point showing numbers of individual birds and species found inside and outside a 50 m. radius circle around the point. Geographic location as well as a UTM grid reference taken with a Garmin GPS unit are shown. Forest types are identified, along with biophysical ecosites as mapped in Banff National Park (Agriculture Canada 1986). The date and starting time for each point count are reported. Temperature, wind and sky conditions (T.W.S.) for each count are indicated using numbers: Temperature in degrees Celsius; wind speed according to the Beaufort Scale; and sky conditions using Weather Bureau code numbers as is done for the Breeding Bird Survey. (explanation of codes is in Appendix 3).

Site descriptions identify the dominant forest type at each point as well as a general estimate of percentage of canopy cover for the dominant tree species. The size of trees for the species which defines the site is presented as a general estimate (small, medium, large) of diameter at breast height (D.B.H.). Major shrubs are listed where applicable and ground cover is noted. The aspect for each site is indicated. Directions to the points are presented in the form of rough field notes to assist in relocating them.

When these point count sites were first established in 1995, every effort was made to find discrete areas of habitat but it must be noted that this part of Banff National Park is extremely heterogeneous. Therefore the most reliable connections between occurrence of bird species and habitats is to be found within the 50 m. circle. In some cases with these eight points, birds reported from beyond the 50 m. circle may have been in more upland habitats which will be unaffected by the change in water levels. However, we have kept our methods and reporting consistent so that comparisons can be made over time.

Water levels did not change significantly from one visit to the next for our surveys in June 2004 although in some places along the approaches to the various points it was slightly wetter on the second visit. North of the tracks, all points were dry for both surveys and very little water was encountered as we traveled to them. At Point 39 there was somewhat more water behind the beaver dam than the previous year. South of the tracks, at Point 36, we were standing in water that was approximately 35 cm. deep on the first visit and slightly deeper on the second. Points 37 and 38 were dry both times but especially closer to the railway tracks, nearby areas were flooded.

We recorded two species that we had not detected in previous years at any of the sites: Red-naped Sapsucker at Point 35, and Hammond's Flycatcher at Point 37. In addition, for the second year in a row, we heard a Veery singing, this time from Point 35.

At individual sites, only Points 38 and 39 did not have any species recorded for the first time in nine years of surveys. Aside from those named above, new species include: Blue-winged Teal at Point 33; American Wigeon at Point 34; Sora at Point 36; Clay-colored Sparrow at Point 37; Black-billed Magpie and Wilson's Warbler at Point 40.

A Fox Sparrow was heard singing from Point 39 making this the only case where a species has been detected each year since the culvert project after not being found in the five years before. And Savannah Sparrow at Point 37 remains the only situation where a species found at a point each year before the project has not been recorded there any year since.

As expected, there was the usual turn-over of species at individual sites, compared to the previous year. Point 35, which showed the smallest change in numbers of species, had the largest change in terms of actual species: 8 were added to, and 9 deleted from, the list of the year before. The other changes produced an increase of 5 species at Point 36, 2 at Point 37, and 3 at Point 40 while decreases occurred of 3 at Point 33, 2 at Point 34, 1 at Point 35, and 4 at both Points 38 and 39.

The number of individual birds remained the same at Point 38 and increased by 1 at Point 40 and 4 at Point 35. Declines were recorded at the other 5 sites, ranging from 2 at Points 36 and 37, to 9 at Point 34.

When the numbers of species observed at each site in 2004 is compared with the 5 year pre-project average, only Points 33 and 39 have been consistently above average. Both are north of the tracks. South of the tracks, Point 36 was above the average for the first time, but very slightly (23 species in 2004; pre-project average: 22.6). Points 37 and 38 consistently have been at or below the average.

A similar comparison with individual bird numbers shows that only Point 33 has been above the average every year since the project. Point 40 is the only site north of the tracks that has been below the average consistently, while south of the tracks, Points 36, 37, and 38 continue the pattern of being below the average year after year. It is an interesting pattern that should be watched.

In concluding, we recommend that this study continue. Our role, primarily, is to collect the data and report them. At some stage, perhaps after one more year when there will be five years of surveys on either side of the culvert project, the results should be subjected to more rigorous analysis than we can provide. Occurrence of individual species or groups of species could be examined for possible effects. But even if no significant effects related to water levels can be detected, there still is considerable value in collecting this kind of information as a form of long-term monitoring.

BIRD MONITORING IN THE VERMILION LAKES WETLAND 2004

POINT 33	Location: VERMILION LAKES	UTM: EASTING:597042 NORTHING:5670400
Ecoregion: MONTANE	Ecosite: (VL1)	Forest Type: WILLOW

DATE	09/06/04			22/06/04		
TIME	5.15.0			5.06.25		
I.W.S.	-2	0	0	11	0	2

	IN	OUT	TOTAL	IN	OUT	TOTAL
BWTE		3	3			
SORA					1	1
COSN					1	1
WFO		1	1			
WIFL		2	2	2	2	4
AMCR					1	1
GCKI	1		1			
SWTH					1	1
AMRO		2	2		3	3
WAVI		2	2		1	1
OCWA		2	2		1	1
YEWB	1		1	1		1
COYE		2	2			
WIWA	1		1		1	1
CHSP				4		4
CCSP		1	1		3	3
SOSP	1		1			
SVSP					1	1
LISP		1	1			
RWBL		2	2		1	1
# Ind.	4	18	22	7	17	24
# Spcs.	4	10	14	3	12	14
Total species for 2 visits = 20						

IN= INSIDE A 50 M. RADIUS CIRCLE, OUT= OUTSIDE OF CIRCLE

LOCATION:

Cross from the pond west of the Beaver Pond at 2nd. Vermilion Lake to the wide channel running east/west. The point is east of deeper sedge meadow along the channel. A green/pink ribbon is on a tall willow about 18 m. from channel. There are some dead aspens to the north in the trees behind the willow flat as you face Norquay. Cascade Mountain is 10°.

SITE DESCRIPTION:

Open channel 10-20 m. wide on south/east side
 Forest: willow shrubs 1-2 m. high , aspen/poplar/spruce at 40 m. on north edge
 DBH: small to medium
 Tree canopy: open (10%)
 Shrubs: fairly dense willows
 Ground cover: tall (60 cm.) sedges/grasses/herbs
 Aspect: flat

BIRD MONITORING IN THE VERMILION LAKES WETLAND 2004

POINT 34	Location: VERMILION LAKES	UTM: EASTING:596837 NORTHING:5670335
Ecoregion: MONTANE	Ecosite: (VLI)	Forest Type: WILLOW

DATE	09/06/04			22/06/04		
TIME	5.33.15			5.23.40		
T.W.S.	-3	0	0	9	0	2

	IN	OUT	TOTAL	IN	OUT	TOTAL
MALL	1		1		1	1
AMWI		1	1			
RUGR		1	1			
COSN					1	1
WIFL	2	3	5	1	2	3
AMCR					1	1
BCCH	1		1			
RCKI		1	1			
SWTH					1	1
AMRO		1	1		2	2
WAVI		1	1		2	2
OCWA					1	1
YEWB	1	2	3	2	1	3
WIWA				2		2
CCSP		2	2		1	1
SOSP		1	1			
RWBL		1	1		2	2
BHCO	1	1	2			
# Ind.	6	15	21	5	15	20
# Spcs.	5	11	13	3	11	12
Total species for 2 visits = 18						

IN= INSIDE A 50 M. RADIUS CIRCLE, OUT= OUTSIDE OF CIRCLE

LOCATION:

Follow edge of channel 200 m. west of Point 33. Green/pink ribbon on tall dead stick beyond a dead tree and a clump of dead willows. The point is 8 m. in from edge of willows on channel side.

SITE DESCRIPTION:

Open channel as for Point 33

Forest: willows up to 2.5 m. high, spruce/poplar on north/west bank just beyond 50m.

Tree canopy: fairly open (20%)

Shrubs: fairly dense willows

Ground cover: tall sedges/grass/horsetail/herbs

Aspect: flat

BIRD MONITORING IN THE VERMILION LAKES WETLAND 2004

POINT 35	Location: VERMILION LAKES	UTM: EASTING:596632 NORTHING:5670227
Ecoregion: MONTANE	Ecosite: (VLT)	Forest Type: WILLOW

DATE	09/06/04			22/06/04		
TIME	5.50.20			5.41.45		
T.W.S.	-2	0	0	9	0	5

	IN	OUT	TOTAL	IN	OUT	TOTAL
COLO		1	1			
CAGO		2	2			
MALL		5	5			
SORA		1	1			
COSN		1	1			
RNSA		1	1			
WIFL	3	1	4	1	2	3
BBMA				4	2	6
AMCR					2	2
VEER					1	1
AMRO				2	2	4
WAVI		2	2		1	1
OCWA				1		1
YEWB		2	2		2	2
COYE	2	1	3	2	2	4
CHSP					1	1
CCSP		1	1	1		1
SVSP				1		1
SOSP		1	1			
LISP	1		1		1	1
WCSP					1	1
RWBL		1	1		1	1
BHCO	5		5		1	1
# Ind.	11	20	31	12	19	31
#Specs.	4	13	15	7	13	16
Total species for 2 visits = 23						

IN= INSIDE A 50 M. RADIUS CIRCLE, OUT= OUTSIDE OF CIRCLE

LOCATION:

Follow edge of channel 200 m. west of Point 34. Green/pink ribbon on tall dead willow with live willow at base, 10 m. from edge of willows on channel side. There is a 3 m. high spruce to the right as you face Mt. Norquay.

SITE DESCRIPTION:

Open channel as for Points 33, 34
 Forest: no trees
 Tree canopy: not applicable
 Shrubs: sparse willows 1 m. high , some birch, many dead stems
 Ground cover: sedges/horsetail/herbs/grasses
 Aspect: flat

BIRD MONITORING IN THE VERMILION LAKES WETLAND 2004

POINT 36	Location: VERMILION LAKES	UTM: EASTING:595060 NORTHING:5669765
Ecoregion: MONTANE	Ecosite: (VL3)	Forest Type: POPLAR/WILLOW

DATE	09/06/04	22/06/04
TIME	7.08.25	7.00.00
T.W.S.	2 0 1	10 0 1

	IN	OUT	TOTAL	IN	OUT	TOTAL
SORA					1	1
COSN		1	1			
?HU				1		1
PIWO					1	1
WIFL		2	2		1	1
LEFL				1		1
AMCR		1	1		1	1
RCKI	1		1	1		1
SWTH					2	2
AMRO	1	1	2			
CEWX				1		1
WAVI	2		2	1		1
OCWA	1		1			
YEWB	1		1	1		1
AMRE	1		1	2		2
NOWA	1		1			
MGWA				1		1
COYE		1	1			
FOSP					1	1
SOSP	1	1	2	1		1
RWBL	1	1	2		1	1
BHCO					1	1
PISI					1	1
# Ind.	10	8	18	10	10	20
# Spcs.	9	7	13	9	9	18
Total species for 2 visits = 23						

IN= INSIDE A 50 M. RADIUS CIRCLE, OUT= OUTSIDE OF CIRCLE

LOCATION:

From the end of Verm. Lakes Rd., go to the large beaver pond west of 3rd. Verm. Lake. Cross along dam to the railroad track. Go west on track about 60 m. from small beaver dam by track. Go into the tall willows between 2 pools on south side of tracks. Follow ribbons. The point is on big willow clump 3 m. behind small dead spruce. Large dead log at base pointing to the small standing dead spruce.

SITE DESCRIPTION:

Forest: dominant tall (9 m.) willows. Outside edge of 50 m circle: spruce/poplar. Small clearings between willow clumps
 DBH: small to medium
 Tree canopy: open (10%)
 Shrubs: willows
 Ground cover: grasses/herbs/horsetail . Flooded during surveys
 Aspect: flat

BIRD MONITORING IN THE VERMILION LAKES WETLAND 2004

POINT 37	Location: VERMILION LAKES	UTM: EASTING:595344 NORTHING:5669685
Ecoregion: MONTANE	Ecosite: (VL3)	Forest Type: POPLAR/WILLOW

DATE	09/06/04			22/06/04		
TIME	7.33.10			7.23.40		
T.W.S.	2	0	1	11	0	1

	IN	OUT	TOTAL	IN	OUT	TOTAL
WIFL				1		1
LEFL		1	1	1		1
HAFL		1	1			
AMCR					1	1
BCCH		1	1			
SWTH	1		1		2	2
WAVI	1	1	2	1		1
OCWA	1	1	2			
YEWB	2		2	1		1
TOWA					1	1
AMRE	2		2	4		4
COYE					1	1
WIWA					1	1
CCSP				1		1
FOSP					1	1
SOSP		1	1			
DEJU		1	1			
BHCO	1		1			
# Ind.	8	7	15	9	7	16
# Spcs.	6	7	11	6	6	12
Total species for 2 visits = 18						

IN= INSIDE A 50 M. RADIUS CIRCLE, OUT= OUTSIDE OF CIRCLE

LOCATION:

Follow railway tracks east of Point 36 to fence post with page wire at end of clearing (opposite east end of pond on north side of track). Follow ribbon trail (8) through willows as it follows the west edge of a large meadow. The point with green/pink ribbon is a small poplar 15 m. south from west bay of meadow. Large poplar 6 m. to the west.

SITE DESCRIPTION:

Forest: mix of tall willows/poplars, some spruce
 DBH: small to large willows, small to large poplars , small to medium spruce
 Tree canopy: fairly dense (30%)
 Shrubs: scattered willows, some gooseberry
 Ground cover: grasses/herbs/horsetail./sedge . Flooded during surveys
 Aspect: flat

BIRD MONITORING IN THE VERMILION LAKES WETLAND 2004

POINT 38	Location: VERMILION LAKES	UTM: EASTING:595615 NORTHING:5669790
Ecoregion: MONTANE	Ecosite: (VL3)	Forest Type: POPLAR/WILLOW

DATE	09/06/04			22/06/04		
TIME	7.55.25			7.44.0		
T.W.S.	4	0	0	11	0	2

	IN	OUT	TOTAL	IN	OUT	TOTAL
COSN		1	1			
WIFL		2	2		2	2
LEFL				1		1
AMCR					1	1
CORA					1	1
RBNU		1	1			
SWTH		1	1			
WAVI	1	1	2	1		1
YEWB	1	1	2		2	2
AMRE	3		3	1		1
NOWA	1		1	2		2
COYE					2	2
FOSP	1		1	1		1
SOSP		1	1	1		1
RWBL		1	1	1	1	2
# Ind.	7	9	16	8	9	17
# Spcs.	5	8	11	7	6	12

Total species for 2 visits = 15

IN= INSIDE A 50 M. RADIUS CIRCLE, OUT= OUTSIDE OF CIRCLE

LOCATION:

Go east from Point 37 along railway tracks to the square cement foundation on each side of tracks. Follow ribbon trail south of tracks as it meanders through willows. The point is in the middle of poplar woods. Green pink ribbons on small poplar near 2 broken 6m. high poplars in clearing behind a leaning poplar.

SITE DESCRIPTION:

Forest: tall poplars, some tall willows
 DBH: large
 Tree canopy: dense (40%)
 Shrubs: rose/willows/a few raspberries
 Ground cover: horsetail/grasses/herbs/small shrubs
 Aspect: flat

BIRD MONITORING IN THE VERMILION LAKES WETLAND 2004

POINT 39	Location: VERMILION LAKES	UTM: EASTING:595173 NORTHING:5669944
Ecoregion: MONTANE	Ecosite: (VL1)	Forest Type: SPRUCE/WILLOW

DATE	09/06/04			22/06/04		
TIME	6.46.0			6.37.10		
T.W.S.	0	0	1	10	0	2

	IN	OUT	TOTAL	IN	OUT	TOTAL
MALL					1	1
COSN	2	1	3	1		1
WIFL				1		1
AMCR		2	2		1	1
RBNU		1	1			
RCKI		1	1			
SWTH					1	1
AMRO		1	1			
WAVI		3	3			
OCWA		1	1			
YEWB					1	1
YRWA		1	1		1	1
AMRE					1	1
NOWA		1	1		1	1
COYE	1	1	2	2	1	3
WIWA		1	1		1	1
CHSP		1	1		1	1
SVSP		1	1			
FOSP					1	1
SOSP	1		1	1		1
LISP				2		2
DEJU					1	1
RWBL		2	2		2	2
BHCO	1		1		3	3
# Ind.	5	19	24	7	17	24
# Spcs.	4	15	17	5	14	18
Total species for 2 visits = 24						

IN= INSIDE A 50 M. RADIUS CIRCLE, OUT= OUTSIDE OF CIRCLE

LOCATION:

Back along the beaver dam west of 3rd. Vermilion Lake. The point is east of beaver lodge. Watch for green/pink ribbon on tallest dead spruce.

SITE DESCRIPTION:

Forest: willow/spruce in marsh

DBH: small

Tree canopy: open (5%)

Shrubs: willow/birch/a few saskatoon 1.5 m high

Ground cover: sedges (30 cm.) tall/grasses/moss on hummocks

Aspect: flat

BIRD MONITORING IN THE VERMILION LAKES WETLAND 2004

POINT 40	Location: VERMILION LAKES	UTM: EASTING:595503 NORTHING:5670283
Ecoregion: MONTANE	Ecosite: (VL1)	Forest Type: SPRUCE/WILLOW/BIRCH

DATE	09/06/04			22/06/04		
TIME	6.22.0			6.11.50		
T.W.S.	-2	0	1	9	0	2

	IN	OUT	TOTAL	IN	OUT	TOTAL
MALL		2	2			
COSN		1	1		1	1
NOFL		1	1			
PIWO		1	1			
BBMA					1	1
RBNU		1	1		1	1
AMRO					2	2
WAVI					1	1
YRWA					1	1
COYE	3	1	4	3	1	4
WIWA		1	1			
WETA		1	1			
CHSP					1	1
SOSP	1		1			
LISP	1		1	1		1
DEJU		1	1			
RWBL	1	2	3	1	3	4
BHCO	1		1			
# ind.	7	12	19	5	12	17
# Spcs.	5	10	13	3	9	10
Total species for 2 visits = 18						

IN= INSIDE A 50 M. RADIUS CIRCLE, OUT= OUTSIDE OF CIRCLE

LOCATION:

Cross on the culverts between 3rd. Vermilion Lake and pond on west side. Follow edge of pool and go towards the stunted spruce to the south/west. The point is a 5 m. high leaning dead spruce (pink ribbon).

SITE DESCRIPTION:

Forest: stunted & scattered spruce/some dead tall willow stems
 Tree canopy: open (1%)
 Shrubs: spruce/willow/birch
 Ground cover: wet sedges/grasses/horsetail
 Aspect: flat

TABLE 1. Average numbers of species recorded over the five years prior to the project at each point as well as the numbers recorded in 2001, 2002, 2003, 2004.

POINT #	5 year average	2001	2002	2003	2004
Point 33	19.6	20	23	23	20
Point 34	20.6	17	23	20	18
Point 35	19	20	24	24	23
Point 36	22.6	19	19	18	23
Point 37	19.8	18	17	16	18
Point 38	19	14	19	19	15
Point 39	19.6	21	23	28	24
Point 40	16.2	14	19	15	18

TABLE 2. Average numbers of individuals recorded over the five years prior to the project at each point as well as the numbers recorded in 2001, 2002, 2003, 2004.

POINT #	5 year average	2001	2002	2003	2004
Point 33	44	47	57	49	46
Point 34	44.6	41	56	50	41
Point 35	51.2	47	48	58	62
Point 36	46.2	37	31	40	38
Point 37	41.2	30	31	33	31
Point 38	34.4	28	34	33	33
Point 39	48.2	40	42	52	48
Point 40	40.8	31	38	35	36

**APPENDIX 1. ABBREVIATIONS FOR BIRDS (following Federation of Alberta Naturalists,
The Vertebrate Species of Alberta, Vol. 23, # 3 1993)**

COLO	Common Loon	BOCH	Boreal Chickadee
AMBI	American Bittern	RBNU	Red-breasted Nuthatch
CAGO	Canada Goose	GCKJ	Golden-crowned Kinglet
GWTE	Green-winged Teal	RCKI	Ruby-crowned Kinglet
MALL	Mallard	VEER	Veery
BWTE	Blue-winged Teal	SWTH	Swainson's Thrush
CITE	Cinnamon Teal	AMRO	American Robin
AMWI	American Wigeon	VATH	Varied Thrush
GBHE	Great Blue Heron	CEWX	Cedar Waxwing
RNDU	Ring-necked Duck	EUST	European Starling
COME	Common Merganser	SOVI	Solitary Vireo
OSPR	Osprey	WAVI	Warbling Vireo
BAEA	Bald Eagle	REVI	Red-eyed Vireo
AMKE	American Kestrel	TEWA	Tennessee Warbler
BLGR	Blue Grouse	OCWA	Orange-crowned Warbler
RUGR	Ruffed Grouse	YEWB	Yellow Warbler
SORA	Sora	YRWA	Yellow-rumped Warbler
KILL	Killdeer	TOWA	Townsend's Warbler
SDSA	Spotted Sandpiper	AMRE	American Redstart
COSN	Wilson's Snipe (Common Snipe)	NOWA	Northern Waterthrush
RUHU	Rufous Hummingbird	MGWA	MacGillivray's Warbler
BEKI	Belted Kingfisher	COYE	Common Yellowthroat
RNSA	Red-naped Sapsucker	WTWA	Wilson's Warbler
NOFL	Northern Flicker	WETA	Western Tanager
PIWO	Pileated Woodpecker	BHGR	Black-headed Grosbeak
WWPE	Western Wood Peewee	CHSP	Chipping Sparrow
ALFL	Alder Flycatcher	CCSP	Clay-colored Sparrow
WIFL	Willow Flycatcher	SVSP	Savannah Sparrow
LEFL	Least Flycatcher	FOSP	Fox Sparrow
HAFI	Hammond's Flycatcher	SOSP	Song Sparrow
EAKI	Eastern Kingbird	LISP	Lincoln's Sparrow
TESW	Tree Swallow	SWSP	Swamp Sparrow
BRSW	Barn Swallow	WCSP	White-crowned Sparrow
GRJA	Gray Jay	DEJU	Dark-eyed Junco
CLNU	Clark's Nutcracker	RWBL	Red-winged Blackbird
BBMA	Black-billed Magpie	BRBL	Brewer's Blackbird
AMCR	American Crow	BHCO	Brown-headed Cowbird
CORA	Common Raven	RECR	Red Crossbill
BCCH	Black-capped Chickadee	PISI	Pine Siskin
MOCH	Mountain Chickadee		

CODES FOR WIND SPEED AND SKY CONDITIONS

Temperature, wind and sky conditions (T.W.S.) are indicated using numbers: Temperature in degrees Celsius; wind speed according to the Beaufort Scale; and sky conditions using Weather Bureau code numbers as is done for Breeding Bird Surveys.

WIND SPEED CODES:

Beaufort #'s	Wind Speed in miles/hr.	Indicators of Wind Speed
0	Less than 1	Smoke rises vertically
1	1 to 3	Wind direction shown by smoke drift.
2	4 to 7	Wind felt on face; leaves rustle.
3	8 to 12	Leaves, small twigs in constant motion; light flag extended.
4	13 to 18	Raises dust and loose paper; small branches are moved.
5	19 to 24	Small trees in leaf sway; crested wavelets on inland waters.

SKY CONDITION CODES:

- 0 - Clear or a few clouds
- 1 - Partly cloudy (scattered) or variable sky
- 2 - Cloudy (broken) or overcast
- 4 - Fog or smoke
- 5 - Drizzle
- 7 - Snow
- 8 - Showers

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