

Neotropical migrant banding at the Delta Marsh Bird Observatory, 1995

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Introduction

The Canadian boreal forest contains one of the most diverse populations of breeding songbirds in North America. Available evidence now suggests that several species of neotropical migratory birds known to breed in this forest have been steadily decreasing, yet baseline information from this critical habitat in Canada is scarce at best.

Birds are a good indicator of the health of the environment. Basic knowledge of population and demographic changes in birds is needed to detect declines, assess their importance, and provide a rational basis for management decisions designed to ensure that populations are not allowed to decline to threatened or endangered levels. Long-term monitoring programs provide the most useful and reliable information on the population status of most bird species (Blancher *et al.* 1994).

Populations of neotropical migrants that breed in the northern boreal forest are not easily monitored by annual breeding season or winter season programs such as the Breeding Bird Survey (BBS) and Christmas Bird Count (CBC). Although surveys on the breeding ground theoretically could provide better data than monitoring during migration, acceptable coverage in these remote areas is unlikely to be achieved. Counting migrants at favourable concentration points, however, enable us to monitor changes of these northern populations that are not monitored in other ways (Blancher *et al.* 1994, Hussell 1993).

Standardized mistnetting is thought to be an objective technique, providing quantitatively reliable information in a relatively short period of time (McCracken *et al.* 1993). Observer-related bias is reduced because surveying passerines with mistnets does not require familiarity with the songs and field marks of birds in an area. The process provides a random sample of each species where heavy vegetation or little movement of migrants would make census methods alone impossible. Mistnetting also provides detailed information on age and sex classes.

The Delta Marsh Bird Observatory (DMBO) is a non-profit organization dedicated to providing

consistent and accurate counts of birds during their migrations. It is part of a growing network of migration monitoring stations and is the only one in Manitoba. As such, it plays a critical role in the collection of much needed regional population data. Recent analyses indicate that a long-term commitment is required to obtain measurements of population changes that are amenable to useful interpretation. Therefore, a minimum of five years of counts is likely to be needed to give any reliable indication of population trends; 10 years or more are desirable (Hagan *et al.* 1994). DMBO is dedicated to serving this requirement into the future.

The Delta Marsh is one of North America's largest marshes covering 21,870 hectares on the south end of Lake Manitoba. Traditionally noted for its abundance of waterfowl, Delta Marsh is also a primary stopover site for migrating shorebirds and songbirds. The Delta Marsh Bird Observatory is situated on the forested dune ridge separating Lake Manitoba and the marsh. The narrow beach ridge provides a natural migration pathway making it an ideal place to situate a monitoring station. Food sources from the marsh and lake make possible large numbers of migrating passerines to be funneled through the narrow forest ridge. DMBO banded almost 8,200 birds in 1995. It is one of the busiest stations in Canada and North America (Tables 1, 2) and it is a critical component of the songbird monitoring network.

Methods

DMBO operates on a daily basis during both the spring and fall migration periods and follows an established protocol which involves banding, a daily census and other continuous observations. The spring and fall banding stations are located on the forested dune ridge which lies between Lake Manitoba and Delta Marsh. In 1995, spring banding occurred from 30 April to 4 June at the Delta Waterfowl and Wetlands Research Station, located 5 km to the east of the University Field Station (UFSDM); fall banding was conducted at UFSDM from 6 July to 30 September.

Banding starts early in the day, about one-half hour before sunrise, and continues for six hours (except under

Table 1. Total birds banded during migration (with number of species) at monitoring stations in Manitoba, Saskatchewan, and Alberta. Differences reflect both banding effort and site differences in birds available. Blanks represent pilot studies for which reliable comparative data are not available (Dale, B., Canadian Wildlife Service, Edmonton, AB; personal communication, 1996).

Station	1993	1994	1995
Delta Marsh, MB	3,990 (77)	5,878 (81)	8,192 (85)
Last Mountain, SK	4,523 (78)	5,240 (79)	2,770 (74)
Beaverhill, AB	2,430 (60)	1,759 (54)	1,061 (52)
Inglewood, AB	-	-	1,549 (61)
Lesser Slave Lake, AB	-	2,313 (53)	3,308 (68)

Table 2. New captures per net hour during songbird migration at sites in Manitoba, Saskatchewan, and Alberta. Overall capture rates (including new birds, recaptures and repeats) would be about 10% higher. By comparison, the average of nine eastern North America stations (in 1987) was 0.59 birds per net hour. Blanks represent pilot studies for which reliable comparative data are not available (Dale, B., Canadian Wildlife Service, Edmonton, AB; personal communication, 1996).

Station	1993	1994	1995
Delta Marsh, MB	1.0	1.3	1.2
Last Mountain, SK	0.6	0.7	0.4
Beaverhill, AB	-	0.4	0.3
Inglewood, AB	-	-	0.4
Lesser Slave Lake, AB	-	1.4	0.7

adverse weather conditions). This is important as some species disappear after the first hour or so of light while others do not appear till later. DMBO runs a series of ten mistnets which are checked every half hour, or more frequently if necessary. All mistnets are a standard 3 x 12 meter, four tier design with a 30 mm nylon mesh. Protocol demands that the nets are placed in the same location each year so that data are comparable from one year to the next. Net opening and closing times are also noted so that trapping effort can be recorded.

Upon removal from the net, each bird is identified and banded. We record it's wing length, fat condition, primary molt, and weight. In addition, when possible, age and sex is determined. All birds are then released.

The objective of the census is to count as many of the birds present as possible from within the defined count area by counting all birds identified by sight or sound along the census route. It is done 1 - 2 hours after sunrise along a predetermined route and takes about 45 - 60 minutes each day. Other observations are made by personnel throughout the six-hour banding period. Birds in the station area, other than those counted on census or banded, are counted to account for visibly migrating birds and indicate general movements.

Daily Estimated Totals (ETs) are calculated based on banding totals, the daily census, and other observations. They are the best estimates of the numbers of each species present in (or migrating through) the station area each day. Although estimates, they are more realistic than any of the three methods on their own.

In addition to our monitoring function, DMBO has also been instrumental in providing feather samples for a study designed to develop new techniques for tracking migratory birds using stable-hydrogen isotopes (Hobson and Wassenaar, 1996). We have also supplied blood samples to Dr. Lisle Gibbs for his ongoing studies to delineate populations of yellow warblers across the continent.

Results

DMBO banded a total of 8192 birds in 1995 representing 85 species. Of this total, 3164 birds representing 75 species were caught during spring migration, and in the fall, 5028 birds of 81 species were recorded (Table 3). The spring produced a catch rate of 1.8 birds/net hour compared to 1.0 birds/net hour in the fall, giving an average of 1.2 birds/net hour for the 1995 season. Our mist net hours totaled 1,760.2 in the spring, and 5,091.2 for the fall. Trend analysis of the data is currently being conducted by Bird Studies Canada.

Following an international workshop on migration monitoring in September 1993, a North American Migration Monitoring Council (MMC) was formed to promote development of migration monitoring for detecting trends in bird populations, the main focus being those species not monitored well by other types of surveys. The group subsequently appointed two technical committees to deal with intensive sites (e.g., bird observatories) and extensive programs (mainly checklist programs).

The Intensive Sites Technical Committee has produced a set of recommendations for operation of intensive sites which provides guidance on the minimum

Table 3. Bird capture summary for the Delta Marsh Bird Observatory, 1992-1995. Spring = May to early June (about 5 weeks); Fall = July to September (about 12 weeks).

	'92 Fall	'93 Fall	'94 Fall	'95 Spr.	'95 Fall		'92 Fall	'93 Fall	'94 Fall	'95 Spr.	'95 Fall
Sharp-shinned Hawk	1	11	4			Nashville Warbler	13	37	109	20	33
Mourning Dove	3	5	6		3	Yellow Warbler	970	832	1436	495	1436
Black-billed Cuckoo	3	4	17	1	3	Chestnut-sided Warbler	15	4	17	10	10
Whip-poor-will					1	Magnolia Warbler	42	51	40	41	27
Yellow-bellied Sapsucker	5	2	7	2	2	Cape May Warbler	2	15	25	9	23
Downy Woodpecker	12	21	9	2	11	Black-throated Blue	1	1	1		
Hairy Woodpecker	8	15	4		6	Yellow-rumped Warbler	74	566	432	291	341
Northern Flicker	4	10	9		11	Black-throated Green	2	4	4	2	2
Olive-sided Flycatcher			1	1		Blackburnian Warbler		3	11	2	1
Eastern Wood-Pewee	27	26	19		16	Palm Warbler	3	14	13	62	5
Yellow-bellied Flycatcher	25	2	6	10	9	Bay-breasted Warbler	6	2	6	1	2
Traill's Flycatcher	26	42	19	74	55	Blackpoll Warbler	29	49	50	146	60
Least Flycatcher	102	76	210	124	127	Black-and-white Warbler	88	37	67	38	50
Eastern Phoebe	11	17	16	1	9	American Redstart	260	122	179	93	120
Great Crested Flycatcher	1		1		4	Ovenbird	32	40	55	21	57
Eastern Kingbird	26	17	17	11	18	Northern Waterthrush	191	199	211	24	173
Tree Swallow	87	363	125	140	92	Connecticut Warbler	2	1	2	3	2
Bank Swallow	6	5	8			Mourning Warbler	15	14	21	10	35
Cliff Swallow	1					Common Yellowthroat	32	43	199	115	105
Barn Swallow	18	13	15		33	Wilson's Warbler	31	8	10	89	32
Blue Jay	1			6	2	Canada Warbler	31	14	23	8	32
Black-capped Chickadee	1	5			18	Northern Cardinal			1		
Boreal Chickadee		1				Rose-breasted Grosbeak	36	32	32	13	55
Red-breasted Nuthatch	2	63	7	1	32	Rufous-sided Towhee			2		1
White-breasted Nuthatch	4	4	3		4	American Tree Sparrow		1		3	
Brown Creeper	3	13	10	7	11	Chipping Sparrow	12	19	28	25	32
House Wren	78	40	104	56	101	Clay-colored Sparrow	4	8	12	54	72
Winter Wren		1		3	1	Savannah Sparrow				7	1
Marsh Wren	2	4	10	1	23	Fox Sparrow	1	4	12	12	9
Golden-crowned Kinglet	4	16	7	7	5	Song Sparrow	107	113	155	33	199
Ruby-crowned Kinglet	55	101	99	182	128	Lincoln's Sparrow	10	3	10	13	8
Veery	5		2	5	2	Swamp Sparrow	2	7	5	12	20
Gray-cheeked Thrush	10	15	10	20	14	White-throated Sparrow	51	93	123	183	124
Swain's Thrush	101	81	92	44	148	White-crowned Sparrow	2			11	2
Hermit Thrush	5	11	31	49	48	Harris' Sparrow	3	2	1	10	5
American Robin	52	58	62	15	66	Dark-eyed Junco	10	114	45	24	77
Gray Catbird	114	82	79	85	102	Red-winged Blackbird		5	37	13	117
Brown Thrasher	2			8		Yellow-headed Blackbird			1	14	14
Cedar Waxwing	13	8	19	6	18	Common Grackle	6	3	12	2	13
Solitary Vireo	11	5	8	7	9	Brown-headed Cowbird	12	2	12	13	9
Yellow-throated Vireo	1		1			Orchard Oriole	5		24	1	10
Warbling Vireo	45	33	86	16	56	Northern Oriole	46	35	124	35	104
Philadelphia Vireo	9	9	12	4	5	Purple Finch	1	1	3	3	2
Red-eyed Vireo	22	17	15	8	16	Pine Siskin	19	9	12	16	23
Golden-winged Warbler	1			1		American Goldfinch	21	29	15	35	23
Tennessee Warbler	91	207	1100	181	284	Total species	81	77	81	75	81
Orange-crowned Warbler	21	51	51	74	69	Total birds	3206	3990	5878	3164	5028

standards that the MMC considers acceptable for collecting data for trend analysis. Bird observatories operating as part of the Canadian network have to meet these standards in order for their data and results to be regarded as acceptable and valid by the larger scientific bird-monitoring community.

Bird Studies Canada (BSC), formed under the auspices of Long Point Bird Observatory in 1995, is responsible for the development of the Canadian Migration Monitoring Network. As yet, no formal relationship has been established between BSC and any of the migration monitoring stations; however, interim Designated Member status has been assigned to the Delta Marsh Bird Observatory along with Beaverhill (Alberta), Last Mountain Lake (Saskatchewan), Thunder Cape (Ontario), and Long Point (Ontario). BSC's role in the network is to provide analysis services to stations using standardized procedures, to provide a national perspective and interpretation of results, and to facilitate communication among stations. BSC is the focal point for non-governmental bird population studies and surveys in Canada. DMBO is dedicated to contributing data to national/international efforts by generating consistent and accurate counts of birds during their migrations.

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