Beaverhill Bird Observatory

1987 to 2006 – 20 Years of Monitoring

Lisa Priestley, Executive Director

March, 2007

Executive Summary

The Beaverhill Bird Observatory is a non-profit charitable organization, established in 1984 and incorporated in 1988. Programs that the BBO is involved with include: Songbird Migration Monitoring, Monitoring Avian Productivity and Survivorship, Northern Saw-whet Owl Fall Migration Monitoring, Fall Raptor Migration, Public Education (Raptor Nest Card and Nocturnal Owl Survey volunteer programs), and Cooperative Projects. This publication presents data from our various programs and outlines some results of bird trends from our long-term monitoring programs.

Cover photos: Magnolia Warbler by Lisa Priestley, Northern Saw-whet Owl by Chuck Priestley, Savannah Sparrow by Paul Burwell.

This publication can be cited as:
Priestley, L. 2007. Beaverhill Bird Observatory 1987 to 2006 – 20 Years of Monitoring. Beaverhill Bird Observatory, Edmonton, AB. 25 pp.

To request a copy, please contact:
Lisa Priestley, Executive Director, Beaverhill Bird Observatory,
Box 1418, Edmonton, AB T5J 2N5,
E-mail: lisa@beaverhillbirds.com

Dedicated to

Elson Olorenshaw,

long time treasurer and bander

of the Beaverhill Bird Observatory.

Table of Contents

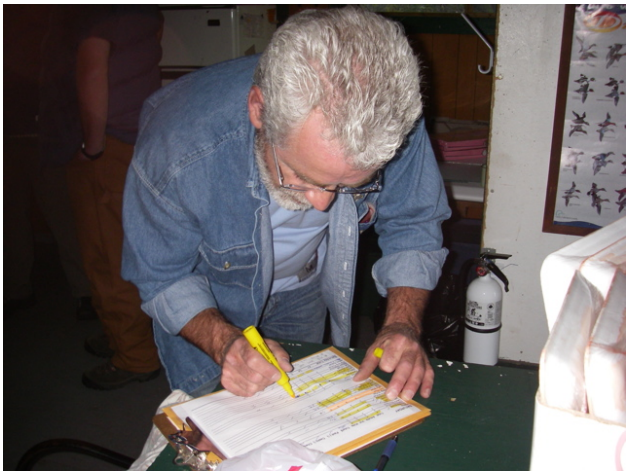
Acknowledgements

The Beaverhill Bird Observatory is a non-profit charitable organization made up of a very dedicated Board of Directors, and we thank them for their support: Christine Boulton, Al DeGroot, Matt Hanneman, Geoff Holroyd, Richard Krikun, Chuck Priestley, James Sheppard, Bryn Spence, Margaret Takats, Sarah Trefry. Previous board members and volunteers that have contributed valued support include: Jim and Barb Beck, Debra Belmonte, Josh Bilyk, Lisa Burt, Rick Chabaylo, Ross Dickson, Jason Duxbury, Rainer Ebel, Roy Fairweather, Jim Faragini, Robin Gutsell, Stefan Jungkind, Janos Kovacs, Steve Lane, Jim Nichols, Elson Olorenshaw, Christine Rice, Petra Rowell, and Enrique Valdez.

Our work would not be possible without funding and in-kind support from the following agencies:

Alberta Community Development
Alberta Conservation Association
Alberta Ecotrust
Alberta Sport Recreation Parks and Wildlife Foundation
Alberta Sustainable Resource Development
Bird Studies Canada (Baillie Fund)
Canadian Wildlife Service (Environment Canada)
Ducks Unlimited, NAWMP
Manning Diversified
Mountain Equipment Co-op
Nature Canada
Shell Environment Fund
Student Career Placement Program
Student Temporary Employment Program
TD Friends of the Environment

The Beaverhill Bird Observatory prides itself on their summer staff and volunteers that work so tirelessly to collect data on birds in the Natural Area and outside. We would like to thank all the staff and volunteers that have worked at the lab over the past 20 years.



**All photos in this report are from Lisa Priestley unless acknowledged.
Cover photos: Magnolia Warbler by Lisa Priestley, Northern Saw-whet Owl by Chuck Priestley, Savannah Sparrow by Paul Burwell.

Background

The Beaverhill Bird Observatory (BBO) is a non-profit charitable organization that was established in 1984. We became incorporated in 1988, and are the second oldest bird banding station in Canada. Our mandate is: to promote community interest in birds and the natural world, to promote the preservation and conservation of Canada's natural heritage, to conduct studies of migrant and resident birds, to assist the work of amateurs and professional biologists and students who are carrying out compatible observations and research work, to engage in educational activities that promote an appreciation for Beaverhill Lake and the natural history of Alberta, and to cooperate with organizations with similar objectives.

Our main research station is located on the southeast shore of Beaverhill Lake in the Beaverhill Natural Area east of Tofield, Alberta. During migration, the lake is extremely important for waterfowl, shorebirds, songbirds, and raptors such as the Peregrine Falcon. The lake provides habitat for a variety of species such as the endangered Piping Plover during the summer. Due to these attributes, the lake has been designated a National Nature Viewpoint by the Canadian Nature Federation, a Wetland of International Importance under the Ramsar Convention and an Important Bird Area of International Importance.

In 1987, the BBO was designated the stewards of the Beaverhill Lake Natural Area, a protected area on the southeast end of the lake. A bird banding laboratory was built in 1986. Over the last 20 years the laboratory has been staffed by summer students who, along with volunteers have been banding and counting birds in and around the Natural Area. Our programs have also expanded to provincial and national programs. This report outlines all of our various projects and programs, and focuses on the long-term datasets we have been collecting.

© Katie Cameron

Main Programs

Banding

Migration Monitoring

Our migration monitoring project is the longest running program we have established. Initiated in 1984 it became a fully standardized program in 1990. The methods we use involve a combination of standardized banding and daily counts that are now used at a chain of stations all across Canada and the northern U.S., the Canadian Migration Monitoring Network. The data collected provides us with much needed baseline data on population trends of northern breeding birds. Since 1990 the number of birds caught at BBO in spring has fluctuated, in 1990 (50.3 birds/100 net hours), 1991 (38.7 birds/100 net hours), 1992 (95.1 birds/100 net hours), 1993 (32.2 birds/100 net hours), 1994 35 (birds/100 net hours), 1995 through 2006 in Table 1 (Table 1, Figure 1). The year 2006 had the lowest capture rate of birds ever at Beaverhill Bird Observatory. Appendix A lists all the species captured in the mist nets spring 1997 through 2006.

Table 1. Spring songbird banding results from 1995 through 2006 at Beaverhill Bird Observatory.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Birds Captured	680	808	616	566	990	876	629	950	755	536	276	243
Birds Banded	n/a	n/a	522	445	812	672	472	740	546	424	196	169
Net Hours	n/a	n/a	1951.10	2477.75	2695.0	2330.0	1755.5	2568.75	2218.75	1809.0	1569.5	1678.25
Capture rate (birds/100NH)	37.0	33.5	31.6	22.8	36.7	37.6	35.8	37.0	34.0	29.6	17.5	14.5
Species Captured	39	47	41	55	45	47	39	55	44	38	32	32

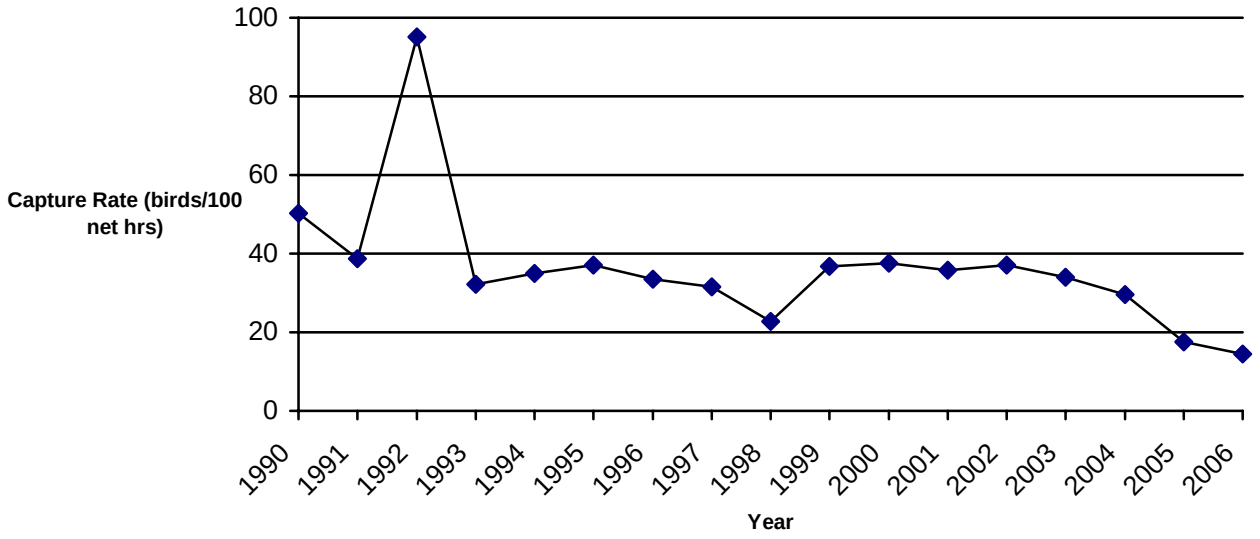


Figure 1. A comparison of spring capture rates (birds/100 net hours) between 1990 and 2006 at BBO.

Fall banding has also had quite large variations in numbers: 1990 (117.9 birds/100 net hours), 1991 (213.8 birds/100 net hours), 1992 (140.8 birds/100 net hours), 1993 (80.3 birds/100 net hours), 1994 (92 birds/100 net hours), 1995 through 2006 in Table 2 (Figure 2). In fall 2005 and 2006 we had an increase in captures, the first since 1998. Appendix B lists all the species captured in mist nets fall 1997 through 2006. We are hoping to better understand these fluctuations and find out whether they are natural or caused by other factors.

Table 2. Fall songbird banding results from 1995 through 2006 at Beaverhill Bird Observatory.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Birds Captured	1102	1905	1820	3862	2742	1740	2095	1734	1315	975	1256	1969
Birds Banded	n/a	n/a	1601	3020	2172	1433	1758	1464	1093	818	1089	1525
Net Hours	n/a	n/a	3433.0	2267.45	2533.5	2843.25	3678.5	4173.75	3818.25	3228.5	2787.25	3476.0
Capture rate (birds/100NH)	40.0	55.1	53.0	170.3	108.2	61.2	56.9	41.2	34.4	30.2	45.1	56.6
Species Captured	49	49	56	60	58	55	56	62	57	60	59	63*

* includes a Mallard and Ruffed Grouse that were captured but not banded

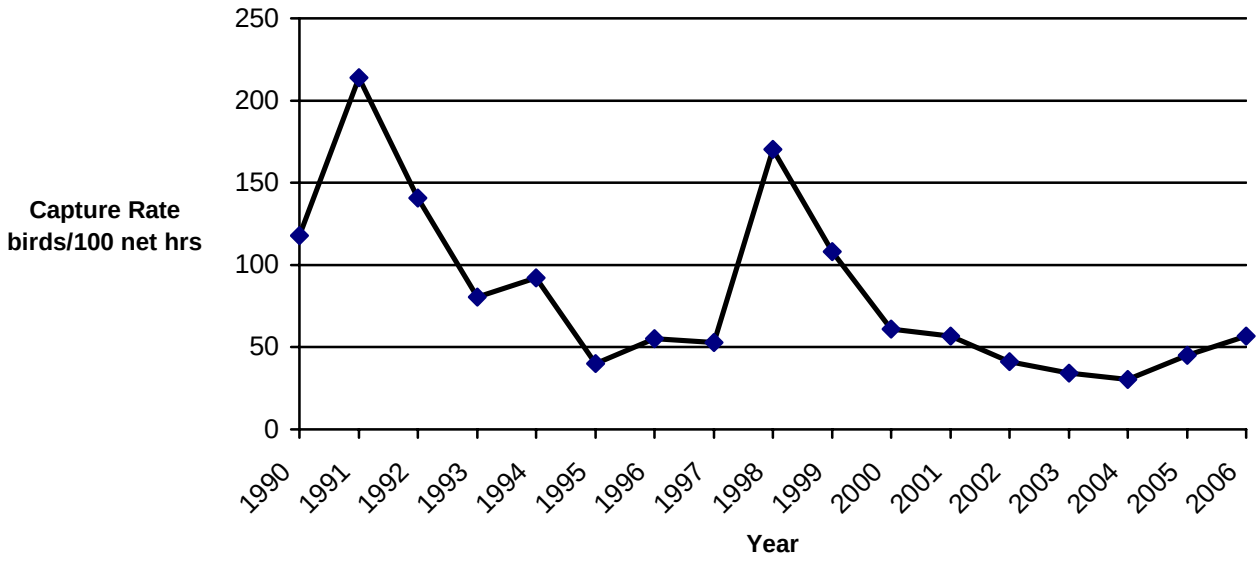


Figure 2. A comparison of fall capture rates (songbirds/100 net hours) between 1990 and 2006.

Monitoring Avian Productivity and Survivorship (MAPS)

We are involved with a summer monitoring program called Monitoring Avian Productivity and Survivorship (MAPS). The program was created by The Institute for Bird Populations in 1989 to assess and monitor the vital rates and population dynamics of over 120 species of North American landbirds in order to provide critical conservation and management information on their populations. The program utilizes constant effort mist netting and banding at a continent-wide network of monitoring stations staffed by both professional biologists and highly trained volunteers (http://www.birdpop.org/maps.htm) (DeSante and O'Grady 2000).

Beaverhill Bird Observatory has three MAPS stations around the Natural Area. The first site called BLAB was established in 1989 near the lab. The second station called WEIR was created in 1994 about 1.3 km east of the lab across from a weir that separates Beaverhill Lake from Lister Lake. The third and final station, PARK was established 500 meters south of the lab in 1996. All sites have been monitored every year using the standardized survey methods of banding and point counts (although point counts are not used by the IBP anymore). The data provides annual indices of adult population size and post-fledging productivity, estimates of adult survivorship, and recruitment, and population growth rate (DeSante *et al.* 2006).

Ten mist nets are set in each of the MAPS sites. There are five 10 day periods over the summer when banding sessions need to be carried out once at each of the sites. Banding starts at sunrise and runs for six hours. If nets have to be closed due to poor weather the netting is completed on another day in that 10 day period.

Table 3. MAPS BLAB banding results from 1998 through 2006 at Beaverhill Bird Observatory.

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006
Birds Captured	95	95	99	45	135	94	80	103	79
Birds Banded	58	50	53	31	78	39	30	65	37
Net Hours	265	292.5	300	116	300	300	300	270	292
Capture rate (birds/100NH)	35.8	32.5	33.0	38.8	45.0	31.3	26.7	48.5	27.1
Species Captured	14	32	15	11	16	13	10	12	13

Table 4. MAPS WEIR banding results from 1998 through 2006 at Beaverhill Bird Observatory.

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006
Birds Captured	92	140	90	73	95	73	62	93	96
Birds Banded	66	97	59	52	61	38	40	66	70
Net Hours	259	295	300	247	300	300	290	240	285
Capture rate (birds/100NH)	35.5	47.5	30.0	29.6	31.7	24.3	21.4	45.4	34.0
Species Captured	10	31	12	12	11	5	10	14	12

Table 5. MAPS PARK banding results from 1998 through 2006 at Beaverhill Bird Observatory.

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006
Birds Captured	59	63	60	77	87	57	46	19	33
Birds Banded	41	51	46	38	60	27	25	12	19
Net Hours	265	300	260	254	300	300	300	240	299.5
Capture rate (birds/100NH)	22.3	21.0	23.1	30.3	29.0	19.0	15.3	11.3	11.0
Species Captured	11	18	10	7	8	6	8	4	7

In addition to banding activities, staff also conducted point counts and nest searches at each station once during each of the five MAPS rounds. There are nine point count stations at each of the three stations and all bird species heard or seen within a ten-minute period are recorded at each station. There have been 89 species recorded on the point count stations since 2002 (Appendix C). No analysis of this aspect of work will be presented in this report. Summer staff conduct nest searches throughout the summer, and all data is contributed to the Prairie Nest Record Scheme. Any raptor nests are GPS'ed and the young are banded. Raptor nests found in the Natural Area include: Sharp-shinned Hawk, Cooper's Hawk, Great Horned, Northern Saw-whet, and Long-eared Owl.

The Beaverhill Bird Observatory also helped establish a MAPS station at Lesser Slave Lake Bird Observatory.

Northern Saw-whet Owl Migration

A pilot Northern Saw-whet Owl migration monitoring program was started in 1997, to determine if saw-whets migrate through the Natural Area. From 2002 through 2004, a full time study was conducted (Priestley and Priestley, 2005). Four saw-whet owl mist nets were set up an hour after sunset, and the call of the saw-whet breeding advertising call was broadcast with a CD player next to the nets. Nets were set from August 15 to early November in 2002-2004 and from early September through early November in 2005 and 2006. This change in the start time was because there were only one or two owls captured before the beginning of September. The objectives of this project are to determine how many, age and sex classes, and timing, of Saw-whets migrating through the Beaverhill Lake region. This work also provides educational opportunities for the public to visit the site and learn about owls.

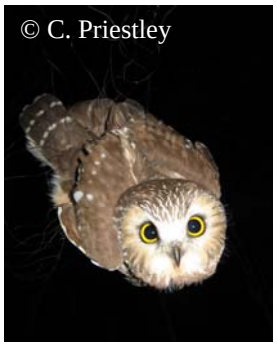


Table 6. The number of Northern Saw-whet Owls captured at Beaverhill Lake 2002-2006.

Year	Number of Nights	Number of Net Hours	Number of Owls Captured	Number of Owls/ 100 Net Hours
2002	74	1097.0	145	13.2
2003	64	903.0	151	16.7
2004	75	1172.0	309	26.4
2005	39*	632.0	135	21.4
2006	37*	575.5	149	26.0
Total	--	--	889	--

* fewer days and net hours due to start in September and poor weather

Table 7. Number of Northern Saw-whet Swls captured at Beaverhill Lake 2002-2006 Sept 1- Nov 8.

Year	Number of Nights	Number of Net Hours	Number of Owls Captured	Number of Owls/ 100 Net Hours
2002	54	887.00	141	15.9
2003	52	791.00	149	18.8
2004	55	900.00	291	32.3
2005	39	632.00	135	21.4
2006	37	575.5	149	26.0
Total	--	--	865	--

Nestboxes


© P. Burwell

We monitor two sets of songbird nestboxes: 1) a Tree Swallow Nestbox Grid of over 50 boxes was established at Beaverhill Lake in 1989 by Peter Dunn (1989), and 2) Elson's Bluebird Trail along roadsides by Beaverhill, Elk Island, and Fort Saskatchewan. These nest boxes are checked each year for occupancy, number of eggs, number of young, and all young birds are banded. We also attempt to catch adult birds coming in to feed the young.

We also have 100 saw-whet owl nest boxes in forested areas on private or provincial land around the Ministik and Beaverhill regions (Priestley *et al.* 2005). Species that have used the boxes include: Northern Saw-whet Owl, Northern Flying Squirrel, Red Squirrel, Tree Swallow, and White-breasted Nuthatch. When Saw-whet Owls use the boxes, volunteer banders attempt to catch and band both adults and then band the young owls before they fledge.

Fall Raptor Migration

We have been documenting the migration of birds of prey in the fall through visual surveys and passive trapping techniques since 1997. Raptors are recorded on a daily census, and up to 32 individual Red-tailed Hawks have been seen circling in the fields of the Natural Area on their southward migration.

We have traps (drop-lid and Swedish Goshawk) set along trails to capture migrating raptors (Table 8). Traps have a lure animal (Rock Pigeon, Japanese Quail, feeder mice, and Russian hamsters) in a separate compartment at the bottom of the cage. Nine species of raptors and two songbirds have been captured in the traps. Traps were not set in 2006 because there was no raptor licensed bander working on site.

Table 8. Species caught and banded during fall raptor monitoring 1997 to 2005.

Species	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Broad-winged Hawk	1	0	1	0	0	1	0	0	0
Cooper's Hawk	2	3	1	3	0	1	1	2	0
Merlin	0	0	0	3	0	0	0	0	0
Northern Goshawk	1	2	0	3	0	1	0	0	1
Red-tailed Hawk	1	0	0	3	0	3	2	11	0
Sharp-shinned Hawk	1	3	0	2	0	2	0	0	0
Long-eared Owl	0	0	0	2	0	0	1	2	0
Northern Saw-whet Owl	0	0	0	1	0	0	0	0	0
Great-horned Owl	0	0	0	1	0	4	3	4	1
Short-eared Owl	0	0	0	0	0	0	0	1	0
Black-billed Magpie	1	0	0	0	1	2	2	19	3
Myrtle Warbler	0	0	0	0	0	0	1	0	0
Total	**7**	**8**	**2**	**17**	**1**	**14**	**10**	**39**	**5**

Band Recoveries

Although most birds that are banded are never recovered, we do get a few recoveries of birds from other geographic locations (Table 9). The most exciting recoveries of songbirds were from two Least Flycatchers, both recovered in Guatemala. A Mourning Warbler banded at the bird observatory August 18, 1994, was recovered in Whitewater Lake, Manitoba 11 days later, and a Myrtle Warbler banded September 8, 2001, was recovered in Montgomery, Alabama 50 days later. Another Myrtle Warbler was recovered in Macon, Georgia. The longevity record goes to a Yellow Warbler banded as a hatch year bird in 1989 and recovered in 1996.

Two species of waterbirds that have been recovered include a Marbled Godwit banded in June 1983 and recovered in March 1984 in Monterey Bay California, and a Herring Gull banded June 1983 and recovered December 1987 in Dixon California. We have had two Red-tailed Hawks recovered outside Alberta, one in Creighton Nebraska, and one in Minneapolis Kansas. Other raptor species recoveries include Great Gray Owl, Great Horned Owl, Northern Saw-whet Owl.

Table 9. Beaverhill Bird Observatory songbird recoveries since 1983.

Species	Banding Date	Location Description	Recovery Date	Recovery Description	Distance (km)
Baltimore Oriole	13-Jun-92	BBO	29-May-93	East Beaverhill, AB	5
Black-capped Chickadee	29-Jun-88	BBO	29-Jul-89	Tofield, AB	8.9
Black-capped Chickadee	16-Oct-83	Beaverhill	29-Aug-89	Edmonton, AB	65
House Sparrow	23-Nov-85	Sth Edmonton	3-Dec-85	Edmonton, AB	3
House Wren	3-Aug-98	BBO	11-Oct-99	St. Paul, AB	105
Least Flycatcher	13-Aug-89	BBO	15-Apr-91	Chiquimula, Guatamala	4775
Least Flycatcher	19-Jul-93	BBO	9-Oct-96	Huehuetanago, Guatamala	4880
Least Flycatcher	7-Jul-97	BBO	21-May-98	East Beaverhill, AB	5
Mountain Bluebird	7-Jul-00	Mundare	6-Jul-04	Viking, AB	130
Mountain Bluebird	7-Jul-00	Fort Saskatchewan	16-Jul-02	Viking, AB	128
Mountain Bluebird	12-Jul-00	Mundare	14-Jun-02	Leduc, AB	80.2
Mountain Bluebird	7-Jul-00	Mundare	6-Jun-03	Viking, AB	115
Mountain Bluebird	6-Jun-02	East Elk Island, AB	6-Jun-03	Viking, AB	96
Mountain Bluebird	18-Jul-02	East Elk Island, AB	12-Jun-03	Ponoka, AB	115
Mountain Bluebird	29-May-01	East Elk Island, AB	9-Jul-03	Elk Island W, AB	15
Mountain Bluebird	7-Jul-00	Fort Saskatchewan	7-Jun-04	Viking, AB	128
Mourning Warbler	18-Aug-94	BBO	29-Aug-94	Whitewater Lake, Man.	971
Myrtle Warbler	8-Sep-90	BBO	19-Jan-91	Macon, GA	3298
Myrtle Warbler	8-Sep-01	BBO	28-Oct-01	Montgomery, AL	3191
Purple Finch	13-Jul-88	BBO	24-Apr-89	Lougheed, AB	97
Purple Finch	26-Aug-87	North Winnipeg	23-Apr-89	St. Vincent Lake, AB	1056
Song Sparrow	7-Jul-92	BBO	May-96	East Beaverhill, AB	5
Tree Swallow	3-Jul-89	BBO	28-Jun-90	Long Lake, MN	1660
Tree Swallow	27-Jun-90	BBO	18-Jun-95	Cooking Lake, AB	40
Tree Swallow	3-Jul-97	BBO	14-May-98	Kitscoty, AB	1
Yellow Warbler	29-Jul-89	BBO	25-May-96	East Beaverhill, AB	5

Waterfowl were banded in March 1988, February and March 1989, March and December 1990, January, February, and March 1991. Over the past 19 years we have been receiving recovery information on various individuals. One American Widgeon and over 100 Mallards have been recovered.

Public Education

Our public education involves a variety of activities both on and off site. We are on site at the Beaverhill Lake Natural Area throughout the spring, summer, and fall for people to come and see the banding operations, and learn about how we study the birds. We have organized groups visit the bird observatory.

We also visit a variety of schools throughout Alberta, giving presentations on birds, banding, raptors, owls, endangered species, and ecology. The Royal Alberta Museum and John Janzen Nature Center also invite us to come and speak to school groups and families during their programs in the summer. We are invited to and participate in annual events including: Beaverhill Lake Snow Goose Festival, Ellis Bird Farm Bluebird Festival, Forest Explorers (Peace River), Migratory Bird Day (Inglewood Bird Sanctuary), and the Songbird Festival (Lesser Slave Lake Bird Observatory). There are some volunteer programs we offer the public to get involved with during these presentations (see next section for information).

We have two fund raising events we offer the public. The BIG Birding Breakfast in late May/early June is a crepe breakfast and songbird banding demonstration. The Steaks and Saw-whets event is held at the end of the September in the evening. This is a steak and chicken barbeque followed by banding demonstration of saw-whet owls.

Volunteer Programs

<u>Raptor Nest Cards</u>

A volunteer raptor nest card program was initiated in 1988 by the Alberta government, for raptor banders and researchers to collect information on nest locations of birds of prey. We have expanded the program to include the public, by providing a datasheet on our website that people can fill out if they find a raptor nest. Results of this will include a better understanding of habitat use, productivity, and phenology (timing of nesting), which will help with status assessment and management. Two papers have been published on the phenology of raptors: Great Horned Owl, Red-tailed and Swainson's Hawks (Priestley 2005a), and Northern Goshawk and Barred Owl (Priestley 2005b). Another paper on Northern Saw-whet Owl and Boreal Owl phenology is being written.

Alberta Nocturnal Owl Survey

Relatively little is known about the abundance and population trends of most species of nocturnal owls in Alberta. Most owls are not adequately monitored by the existing multi-species continent-wide surveys in North America such as the Breeding Bird Survey. The Beaverhill Bird Observatory took the lead in developing guidelines for a national owl survey program (Takats *et al.* 2001). Representatives from the main volunteer surveys in Canada met in September 1999 to develop a set of standards for owl monitoring. The outcome of that meeting was agreement on a set of standard components that should be incorporated into roadside surveys for breeding owls. These meetings, with subsequent discussions, have led to development of guidelines for survey protocols that we hope will be adopted by all organizations running nocturnal roadside surveys for owls. The North American-wide initiative was developed to achieve the following objectives:

1. Obtaining information on distribution of owls.
2. Estimating relative abundance of owls within regions and across North America.
3. Estimating trends in populations of nocturnal owls at scales ranging from regional (ie. ecoregion, province, state) to continental.
4. Determining habitat associations of owls.

The Alberta Nocturnal Owl Survey (ANOS) has been running since 1998. The purpose of the Alberta Nocturnal Owl survey is to collect information to help determine status of species, and to act as an early warning signal if populations are declining. The goals of this program are to: obtain information on distribution and relative abundance of nocturnal owls in Alberta, collect information that will lead to estimating population trends of nocturnal owls at regional and provincial scales, as well as contribute to a North America-wide program, and determine habitat associations of nocturnal owls. The pilot year was in 1998, with 30 volunteers surveying 15 transects. Presently, there are 180 volunteers surveying 92 routes throughout Alberta.

Table 10. Data (submitted to date) from Alberta Volunteer Nocturnal Owl Survey 2003-2006, number (owls/10 stops).

Species	**2003**	**2004**	**2005**	**2006**
Barred Owl	22 (0.359)	27 (0.320)	18 (0.205)	13 (0.143)
Boreal Owl	36 (0.588)	45 (0.534)	39 (0.445)	35 (0.386)
Great Gray Owl	8 (0.131)	19 (0.225)	9 (0.103)	9 (0.099)
Great Horned Owl	137 (2.239)	273 (3.238)	176 (2.007)	152 (1.678)
Long-eared Owl	9 (0.147)	28 (0.332)	14 (0.160)	18 (0.199)
Northern Pygmy Owl	2 (0.033)	4 (0.047)	4 (0.046)	3 (0.033)
Northern Saw-whet Owl	111 (1.814)	269 (3.191)	136 (1.551)	158 (1.744)
Short-eared Owl	2 (0.033)	0 (0.000)	2 (0.023)	3 (0.033)
Unknown Owl	2 (0.033)	5 (0.059)	6 (0.068)	4 (0.044)
TOTAL	329 (5.376)	670 (7.948)	404 (4.607)	383 (4.360)
Number of Routes	62	86	90	92
Number of Volunteers	116	163	177	180

Collaborative Projects

We have been involved with supporting Endangered Species work, particularly with the Burrowing Owl. This work includes:

-Conservation of Burrowing Owls including surveys studies of over-winter survival, diet and foraging ecology of burrowing owls in central Mexico funded by National Fish and Wildlife Foundation 2000-2004
-North American Burrowing Owl Conservation Action Plan drafted under contract to Commission for Environmental Cooperation 2004
-Funding for proceedings and international attendees at the Second International Burrowing Owl Symposium, Ogden, Utah and published in Journal of Raptor Research 35:(4)269-418
-Surveys and banding of songbirds in eastern Guatemala with USGS and FUNDAECO in 1993-94
-Trapping of a possible new subspecies of owl in Ecuador in 2006, to collect feathers and blood for DNA analysis

Graduate Students

Beaverhill Bird Observatory has been very supportive over the years to graduate students. Two students studied birds on site at Beaverhill Lake. In 1989 Peter Dunn completed his PhD. thesis on "The Maintenance of Monogamy in Black-billed Magpies and Tree Swallows" through the University of Alberta. Two papers were published from this work (Dunn and Hannon 1991, Dunne and Hannon 1992). In 1990, Mike Quinn completed a Masters thesis on "Factors Regulating the Breeding Population, Reproductive Success and Mating System of House Wrens, *Troglodytes aedon*, at Beaverhill Lake, Alberta".

Jason Duxbury completed his Masters and PhD using isotopes in studying Burrowing Owls and other raptor species. We provided Northern Goshawk feather specimens to Adam Smith (Boise State University) and Shawn Hawks (North Dakota State University) for their theses on various aspects of isotopes. Feathers were also collected for Chuck Priestley for his Masters thesis on Northern Saw-whet Owls (in progress).

Water Levels Study

A grassland/parkland bird study was conducted in 1992 at Beaverhill Lake Natural Area to investigate bird species richness and abundance in a transition zone between woodland and lake. In 2004, the survey was conducted again to determine if and how bird species and habitat had changed with the changing water levels at Beaverhill Lake since 1992-93. The breeding bird census involved mapping the locations of all birds seen and heard in June and early July. In 2004, Beaverhill Lake was almost dry. Shrubs and trees encroached on the grassland community, and the mud flats from 2003 had sedges and grasses grow in quickly during the spring. Savannah Sparrow numbers dropped while Clay-colored Sparrow numbers increased. New species recorded included young forest dependent Yellow Warblers and Least Flycatchers (Priestley and Holroyd 2006).

The declines in the grassland and waterbird species can be explained by the encroachment of shrubs and trees onto the grassland, and the lack of water present in 2004. Further the increase in shrub and tree species also can be explained by the habitat changes. Beaverhill Lake was close to drying in 1880s and 1950s, showing it has naturally fluctuating water levels. In recent years, the drought conditions combined with low run-off have resulted in very low water levels. The lower water levels results in warmer water temperatures which increase the evapotranspiration rates. Whether the continued drought can be attributed to only natural environmental conditions or something related to anthropogenic disturbance has to be investigated further. It is our hope that the water levels will rise again in the lake, to bring the vegetation back to its former condition. By monitoring bird species throughout a full cycle of lake level changes, we may better understand the effects this has on species.

Table 11. Total number of territories and nest observed in 1992, 1993, and 2004.

Species	**# of Territories 1992**	**# of Nests 1992**	**# of Territories 1993**	**# of Nests 1993**	**# of Territories 2004**	**# of Nests 2004**
Mallard	4	4	6	6	0	0
Northern Shoveler	1	1	0	0	0	0
Lesser Scaup	6	6	0	0	0	0
Blue-winged Teal	3	3	0	0	0.5	0
Duck spp.	6	6	2	2	0	0
Northern Harrier	0	0	1	1	1	*
Wilson's Phalarope	11	1	5	5	0	0
Short-eared Owl	0	0	0	0	1	1
Least Flycatcher	0	0	0	0	3	2
Marsh Wren	0	0	0	0	0.5	0
Yellow Warbler	2	0	2	0	4.5	1
Common Yellowthroat	1.5	0	2.5	0	4	0
Savannah Sparrow	48	2	35	0	32	3
Clay-colored Sparrow	6	1	5	0	16	5
LeConte's Sparrow	4	0	6	0	1	0
Lincoln's Sparrow	0	0	0	0	1	0
Sharp-tailed Sparrow	9	0	7	0	4	*
Song Sparrow	0	0	0	0	1	0
Red-winged Blackbird	16.5	3	17	8	0.5	0
Yel.-headed Blackbird	3	0	0	0	0	0
Brewer's Blackbird	0	0	0	0	1	0
TOTAL	121	27	96.5	23	71	12

*nest not located, but every indication of one present in the area (defensive behavior by adults)

Migratory and Summer Bird Habitat Associations


© C. Priestley

In 1998, Josh Bilyk conducted a survey on migratory and summer bird habitat associations of the Beaverhill Lake landscape (Bilyk *et al.* 1998). This study details the specific habitats associated with bird species identified within the Beaverhill Lake Landscape in order to determine which habitats support the greatest avian diversity. This information can then be used to help to manage and conserve of these areas. Nineteen different habitat types (11 upland and 8 wetland categories) were defined. These included: continuously-grazed grassland, cropland, delayed hay, idle deciduous upland, large seasonal wetland and small semi-permanent wetland.

A total of 146 species were observed during 519 surveys in the Beaverhill Lake Landscape. In general, wetland habitats had a greater diversity of bird species than uplands in the summer. Large saline wetlands and riparian areas were found to have the highest avian diversity followed by medium seasonal and large semi-permanent wetlands. The lowest variety was found in delayed haylands. During migration, large saline wetlands and grazed deciduous uplands ranked the highest in terms of avian diversity. Thirty species of special status were observed. Large saline wetlands had the highest number of species of special status for both summer and migration seasons. During the summer, continuously-grazed grassland, idle native grassland and large semi-permanent wetlands held the next highest number of species of special status.

Although wetlands had a high diversity of bird life, grassland areas were found to have a greater proportion of species of special status. During the summer, delayed hay had the lowest avian diversity, but one third of birds observed in this habitat are species of special status. Protection and management of Beaverhill Lake must be central to any conservation plan for this area. Although wetlands were the most important habitat for total number of species of special status, grasslands had the greatest number of summer species of special status. Consequently, both large wetlands and grasslands must be managed to conserve habitat for those species of special status.


© J. Duxbury

Distinct associations were observed between certain habitat types and either large numbers of species or species of special status. The following recommendations are provided to facilitate an ecosystem approach to conservation program planning.

1. Retain grasslands (as pasture).
2. Retain woodlands.
3. Protect and restore wetlands.
4. Protect areas of special ecological significance (such as only observed locations of an uncommon species).
5. Communicate wildlife anomalies to the agricultural community so that in cases where management options exist to overcome a potential problem (such as payments for delayed haying of known field-nesting raptor nest sites), programs could be promoted and offered.

Lesser Slave Lake Bird Observatory

In 1992 a project was initiated to monitor birds at Lesser Slave Lake, and the Lesser Slave Lake Bird Observatory was operated as a sub-committee of the BeaverhillBird Observatory until 1996 when it became an independent organization. The LSLBO has been in operation since conducting migration monitoring and MAPS programs and has worked to develop the new Boreal Centre for Bird Conservation (http://www.borealbirdcentre.ca/).

Other Survey Programs

We have also participated in various provincial and international survey programs like: NABA butterfly counts (http://www.naba.org/counts.html), dragonfly surveys, and RANA (Researching Amphibian Numbers in Alberta). We conducted Rail surveys for the Alberta Conservation Association in 1999. The Beaverhill Bird Observatory provided all their bird data to Federation of Alberta Naturalists for the original Alberta Breeding Bird Atlas and to the Bird Atlas update 2007. Summer staff have also been documenting the species of butterflies in the Natural Area and determining the habitats they are associated with.

Beaverhill Lake Natural Area Stewards

As Stewards of the Beaverhill Lake Natural Area, the Beaverhill Bird Observatory is always trying to improve the protection of the Natural Area, while trying to provide interpretive opportunities for the public. This has been done in variety of ways. First, we wrote the Important Bird Area Conservation Plan for Beaverhill Lake (Krikun and Holroyd 2001). We received funding from Nature Canada to repair fences and gates to reduce access to motorized vehicles. The BBO was awarded the Steward of the Year from the provincial government in 2007.

Funding from Shell and Alberta Conservation Association went towards building a kiosk at the main parking area. The kiosk provides a map to the trails and highlights the importance of the Natural Area. All trails are signed with handmade signs, and are named after birds that are frequently seen along those trails. There are also a number of signs scattered throughout the Natural Area that focus on specific wildlife species that a person would see and the natural history of those species.

Publications and Presentations

Our data has been used in a variety of publications.

Brewer, D., A. Diamond, W. Woodsworth, B. Collins, and E. Dunn. 2000. Canadian atlas of bird banding, Vol. 1: Doves, Cuckoos, and Hummingbirds through Passerines 1921-1995. Environment Canada, Canadian Wildlife Service. 400 pp.

Dunn, E. 2002. A cross-Canada comparison of mass change in birds during migration stopover. Wilson Bulletin 114(3): 368-379.

DeSante, D.F. and D.R. O'Grady. 2000. The monitoring avian productivity and survivorship (MAPS) program 1997 and 1998 report. Bird Populations 5: 49-101.

Flockhart, T. 2001. Rare or unusual bird sightings for Beaverhill Lake, Alberta 1996-2000. Blue Jay 59(1): 22-40.

Priestley, L. 2005. Northern goshawk and barred owl phenology in Alberta. Nature Alberta 35(2): 10-12.

Priestley, L. 2005. Phenology of three raptor species in Alberta. Blue Jay 63(1): 26-30.

Priestley, L. 2004. The barred owl in Alberta: distribution and status. Canadian Field-Naturalist 118: 215-224.

Technical Reports

Bilyk, J N., M. Barr, and G.L. Holroyd. 1998. Migratory and summer bird habitat associations of the Beaverhill Lake Landscape. Beaverhill Bird Observatory, Edmonton, AB. On-line at: http://www.nawmp.ab.ca/reference/summary8.html

Duxbury, J.D. 1994. A manual for monitoring bird migration. Beaverhill Bird Observatory, Edmonton, AB. 99 pp.

Duxbury, J.D. 1994. The Lesser Slave Lake Bird Observatory operations manual. Beaverhill Bird Observatory, Edmonton, AB.

Krikun, R. and G.L. Holroyd. 2001. Beaverhill Lake Important Bird Area Conservation Plan. Alberta Important Bird Areas Program, Federation of Alberta Naturalists and Bird Studies Canada. 26 pp.

Priestley, L. and G. Holroyd. 2006. Bird population changes in drought at Beaverhill Lake. Beaverhill Bird Observatory, Edmonton, AB.

Priestley, D.L., C.M. Francis, G.L. Holroyd, J.R. Duncan, K.M. Mazur, R.J. Cannings, W. Harris, and D. Holt. 2001. Guidelines to nocturnal owl monitoring in North America. Beaverhill Bird Observatory and Bird Studies Canada, Edmonton, AB.

Spence, B. 2004. The who, what, and why of Beaverhill Bird Observatory, fostering an appreciation of the world around us. Beaverhill Bird Observatory, Edmonton, AB. 7 pp.

Takats, L. 1998. Nocturnal owl surveys in the Foothills Model Forest, a model for a volunteer program. Beaverhill Bird Observatory, Edmonton, AB. 10 pp.

Annual Reports

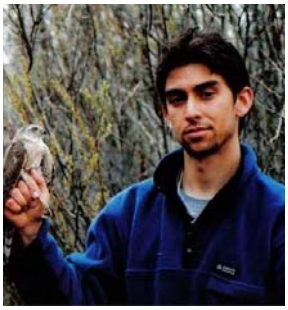
Campbell, L. (ed.) 1991. Beaverhill Bird Observatory 1990 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Duxbury, J. 1995. Beaverhill Bird Observatory 1993 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Duxbury, J. and P. Rowell. 1996. Beaverhill Bird Observatory 1994 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Flockhart, T. (ed.) 2000. Beaverhill Bird Observatory 1999 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Hanneman, M. (ed.) 2004. Beaverhill Bird Observatory 2004 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.



Holroyd, G. (ed.) 1987. Beaverhill Bird Observatory 1985 Annual Report. Edmonton Naturalist 15(2): 5-11.

Jungkind, S. 1988. Beaverhill Bird Observatory 1986 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Jungkind, S. 1988. Beaverhill Bird Observatory 1987 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Jungkind, S. 1990. Activities at the Beaverhill Bird Observatory 1988 and 1989. Beaverhill Bird Observatory, Edmonton, AB.

Jungkind, S. 1990. Beaverhill Bird Observatory 10 Year Report (1980-1989). Beaverhill Bird Observatory, Edmonton, AB.

Krikun, R. (ed.) 2002. Beaverhill Bird Observatory 2002 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Priestley, C. (ed.) 2001. Beaverhill Bird Observatory 2000 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Priestley, L. (ed.) 2006. Beaverhill Bird Observatory 2005 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Rice, C. and J. Duxbury. 1998. Beaverhill Bird Observatory 1997 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Rowell, P. (ed.) 1993. Beaverhill Bird Observatory 1992 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Rowell, P. (ed.) 1996. Beaverhill Bird Observatory 1995 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Rowell, P. and G.L. Holroyd (eds.) 1997. Beaverhill Bird Observatory 1996 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Takats. L. (ed.) 1999. Beaverhill Bird Observatory 1998 Annual Report. Beaverhill Bird Observatory, Edmonton, AB.

Presentations

Beaverhill Bird Observatory staff and executive have attended numerous conferences to present information about our research to the scientific community. Some recent ones include:

Alberta Chapter of the Wildlife Society – Banff, Edmonton, Calgary
Raptor Research Foundation Conference – September 2003, Anchorage, Alaska
Alberta Conservation Association, Partners in Conservation – Edmonton
Endangered Species Prairie Conservation conference 1998 in Saskatoon, Saskatchewan.
Raptor Research Conference, November 1-5, 1999 in La Paz, Mexico
Forest Explorers, November 2003 and November 2006 in Peace River, AB

References and Literature Cited

DeSante, D.F. and Nott. 2004. http://www.birdpop.org/DownloadDocuments/Eurinews.pdf

DeSante, D.F., K.M. Burton, P. Velez, D. Froehlich, D. Kaschube. 2006. MAPS manual 2006 protocol. Institute for Bird Populations, Point Reyes Station, CA. 75 pp.

DeSante, D.F. and D.R. O'Grady. 2000. The monitoring avian productivity and survivorship (MAPS) program 1997 and 1998 report. Bird Populations 5:49-101.

Krikun R.G. and G.L. Holroyd. 2001. Beaverhill Lake Important Bird Area Conservation Plan. Alberta Important Bird Areas Program, FAN/BSC. 26 pp.

Priestley, C., B. Spence, and L. Priestley. 2005. Northern saw-whet owl nest box monitoring. Blue Jay 63(2): 71-76.

Priestley, C., and L. Priestley. 2005. Results of a pilot study monitoring northern saw-whet owl migration in central Alberta, Canada. Western Birds 36: 303-309.

Priestley, L. 2005a. Phenology of three raptor species based on nest banding records. Blue Jay 63: 26-29.

Priestley, L. 2005b. Northern goshawk and barred owl nesting phenology in central Alberta. Nature Alberta 35 (2): 10-12.

Takats, D.L. C.M. Francis, G.L. Holroyd, J.R. Duncan, K.M. Mazur, R.J. Cannings, W. Harris, and D. Holt. 2001. Guidelines to nocturnal owl monitoring in North America. Beaverhill Bird Observatory and Bird Studies Canada, Edmonton, Alberta. 24 pp.

Appendix A. Species captured at Beaverhill Bird Observatory spring 1997-2006.
Blue text indicates top five species captured each year.

Species	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Alder Flycatcher	9	4	1	0	0	1	3	0	2	1
American Goldfinch	14	9	3	12	6	12	5	2	4	6
American Redstart	0	6	2	6	3	14	4	3	1	4
American Robin	6	7	15	5	2	5	2	2	11	5
American Tree Sparrow	0	1	0	0	0	0	0	0	0	0
Baltimore Oriole	1	0	17	10	3	11	0	5	3	4
Barn Swallow	0	1	0	0	0	0	0	0	0	0
Bay-breasted Warbler	0	0	0	1	0	0	0	0	0	0
Black-and-White Warbler	0	1	3	2	0	3	0	0	1	0
Black-capped Chickadee	6	4	15	16	6	21	16	11	10	1
Blackpoll Warbler	8	3	15	18	6	7	0	4	0	1
Black-throated Green Warbler	0	0	0	1	0	0	1	0	0	0
Blue-headed Vireo	0	0	2	2	0	1	0	1	0	0
Brown-headed Cowbird	39	10	19	9	2	7	8	2	5	11
Bullock's/Baltimore Oriole	0	1	0	0	0	0	0	0	0	0
Canada Warbler	1	0	0	1	1	1	0	0	0	0
Cape May Warbler	1	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	4	14	2	0	0	0	0	0	0
Chipping Sparrow	40	12	28	32	91	5	18	59	1	6
Clay-colored Sparrow	172	123	174	97	104	143	40	51	27	23
Common Yellowthroat	1	1	1	9	2	10	1	0	0	0
Connecticut Warbler	0	2	0	0	1	0	1	0	0	0
Cooper's Hawk	1	0	0	0	0	0	0	0	0	0
Eastern Palm Warbler	1	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0	2	2	3	0	2	0	0	0	0
Evening Grosbeak	0	0	0	0	0	0	0	1	0	0
Fox Sparrow	0	0	0	0	0	2	0	0	0	0
Golden-crowned Kinglet	0	0	0	0	1	1	1	0	0	0
Gray Catbird	2	1	4	1	2	5	0	1	0	0
Gray-cheeked Thrush	0	2	0	0	0	1	2	0	1	1
Hairy Woodpecker	1	0	0	1	0	1	1	0	0	0
Hermit Thrush	5	4	6	3	2	8	20	6	2	2
House Wren	16	25	50	27	53	32	29	10	8	17
Least Flycatcher	80	106	187	191	100	228	174	51	68	69
Lincoln's Sparrow	16	3	18	18	14	9	20	5	3	2
Long-eared Owl	0	0	0	0	0	0	0	0	0	2
Magnolia Warbler	0	3	3	6	1	4	0	0	0	1
Mallard	0	0	0	0	0	0	0	0	0	1
Mourning Warbler	0	1	1	5	5	9	1	1	0	0
Myrtle Warbler	29	25	113	31	28	35	149	162	19	2
Nashville Warbler	0	0	0	0	2	0	0	0	0	0
Northern Mockingbird	0	0	1	0	0	0	0	0	0	0
Northern Waterthrush	0	1	1	3	3	1	3	0	0	0
Olive-sided Flycatcher	0	0	0	0	0	0	0	0	1	0
Orange-crowned Warbler	12	10	9	9	5	7	5	7	9	2
Ovenbird	0	1	3	5	2	11	1	0	3	1
Philadelphia Vireo	0	0	0	2	0	3	0	0	0	0
Pine Siskin	2	0	2	2	0	2	0	0	0	0
Purple Finch	3	0	4	0	3	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	3	0	6	2	5	0	0
Red-eyed Vireo	3	7	8	9	1	5	2	0	3	0
Red-winged Blackbird	3	0	5	0	0	1	0	0	0	0
Rose-breasted Grosbeak	0	1	1	2	2	3	1	3	1	1
Ruby-crowned Kinglet	0	3	2	1	2	4	11	3	0	0

Ruby-throated Hummingbird	0	0	0	1	0	0	3	1	0	0
Savannah Sparrow	3	3	5	2	3	1	2	3	0	4
Sharp-shinned Hawk	0	1	2	0	1	0	2	0	1	0
Slate-colored Junco	0	3	2	0	0	25	0	1	0	2
Song Sparrow	3	3	6	0	0	2	1	3	5	6
Sparrow sp.	0	0	0	0	0	0	2	0	0	0
Swainson's Thrush	26	17	25	29	31	82	30	40	20	19
Swamp Sparrow	0	0	0	0	0	0	0	1	0	0
Tennessee Warbler	1	1	10	32	8	9	1	4	1	1
Traill's Flycatcher	0	3	18	13	15	12	6	6	7	7
Tree Swallow	4	4	1	1	0	3	1	2	0	0
Unknown Yellow-rumped Warbler	0	0	0	0	0	1	0	0	0	0
Varied Thrush	0	1	0	0	0	0	0	0	0	0
Veery	0	2	0	0	0	1	0	0	1	0
Vesper Sparrow	1	0	0	0	0	0	0	0	0	0
Warbling Vireo	6	4	9	6	8	5	6	5	3	1
Western Palm Warbler	1	1	0	3	3	1	1	3	0	0
Western Tanager	1	0	0	0	0	0	0	1	0	0
Western Wood-pewee	3	2	0	0	0	3	2	1	0	0
White-crowned Sparrow	1	0	6	3	3	1	4	5	1	0
White-throated Sparrow	12	8	41	79	17	60	48	20	6	5
Wilson's Warbler	0	0	0	0	0	3	0	0	0	3
Yellow Warbler	80	127	135	160	87	115	119	38	47	32
Yellow-bellied Flycatcher	1	1	0	2	0	2	1	0	0	0
Yellow-bellied Sapsucker	1	1	1	0	0	3	3	7	1	0
Yellow-shafted Flicker	0	0	0	0	0	0	2	0	0	0
Total	**616**	**566**	**990**	**876**	**629**	**950**	**755**	**536**	**276**	**243**

Appendix B. Species captured at Beaverhill Bird Observatory fall 1997-2006.
Blue text indicates top five species captured each year.

Species	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Alder Flycatcher	35	3	1	0	0	2	3	1	1	16
American Goldfinch	0	1	3	5	2	3	3	1	6	3
American Redstart	66	67	141	30	62	156	42	99	62	42
American Robin	0	2	0	1	3	0	5	2	8	1
American Tree Sparrow	26	76	7	12	3	17	71	34	28	156
Baltimore Oriole	2	3	1	0	1	1	0	1	0	3
Barn Swallow	6	0	0	0	0	0	0	0	0	0
Bay-breasted Warbler	0	1	5	0	5	2	2	2	2	3
Black-and-White Warbler	4	8	9	5	6	8	6	10	7	9
Black-billed Magpie	0	3	0	1	0	0	1	0	0	0
Black-capped Chickadee	180	165	97	118	136	188	91	104	126	227
Blackpoll Warbler	22	60	17	12	17	25	14	11	24	23
Black-thr. Blue Warbler	0	0	0	0	1	0	0	0	0	0
Black-thr. Green Warbler	1	2	6	1	1	2	0	0	3	0
Blue Jay	0	1	0	1	0	0	0	0	0	2
Blue-headed Vireo	2	1	2	0	2	8	1	2	1	2
Brown Creeper	0	3	1	0	1	1	2	2	1	7
Brown-headed Cowbird	0	0	0	3	2	0	0	0	1	1
Canada Warbler	3	0	6	4	9	7	2	10	2	3
Cape May Warbler	5	11	19	2	3	4	7	3	1	1
Cedar Waxwing	3	0	0	3	0	2	2	0	9	2
Chestnut-sided Warbler	1	0	1	0	0	0	0	1	0	0
Chipping Sparrow	1	0	0	3	0	9	2	1	1	0
Clay-colored Sparrow	25	98	87	84	118	36	38	13	18	19
Common Yellowthroat	7	9	4	9	13	3	3	3	3	0
Connecticut Warbler	3	2	3	1	1	1	0	1	0	0
Cooper's Hawk	0	0	1	0	0	0	0	1	0	0
Downy Woodpecker	6	10	10	11	7	10	12	4	8	11
Eastern Phoebe	0	0	2	0	0	0	0	0	0	1
Fox Sparrow	0	0	0	4	0	3	1	6	2	1
Golden-crowned Kinglet	9	8	1	2	2	1	3	1	3	2
Gray Catbird	1	1	1	0	3	3	2	0	0	0
Gray-cheeked Thrush	1	1	0	0	0	1	1	0	1	0
Hairy Woodpecker	2	2	3	1	1	2	4	1	2	7
Hermit Thrush	11	6	2	14	8	16	30	15	13	5
House Wren	37	36	45	22	20	25	26	14	9	10
Least Flycatcher	181	312	310	248	338	308	233	101	232	91
Lincoln's Sparrow	2	3	7	6	1	3	3	16	5	8
MacGillivray's Warbler	1	0	0	0	0	0	0	3	0	0
Magnolia Warbler	20	26	31	15	22	25	17	32	27	23
Mallard	0	0	0	0	0	0	0	0	0	1
Mourning Warbler	6	6	5	1	13	5	7	7	2	3
Myrtle Warbler	396	1843	274	199	265	205	193	31	196	648
Nashville Warbler	1	1	1	1	1	1	0	2	0	0
Northern Flicker	0	0	0	0	0	0	0	0	0	1
Northern Shrike	0	0	1	0	0	0	1	0	0	0
Northern Waterthrush	10	10	11	5	11	15	12	20	15	7
Orange-crowned Warbler	111	91	30	58	65	33	56	36	44	64
Oregon Junco	0	6	0	0	0	0	0	0	1	0
Ovenbird	5	13	15	11	21	15	28	33	32	42
Philadelphia Vireo	4	9	3	1	0	1	4	1	6	7
Pine Siskin	1	1	0	0	0	0	0	0	0	4
Purple Finch	0	1	1	0	0	1	0	0	3	0
Red-breasted Nuthatch	9	8	12	12	18	8	3	11	1	3

Red-eyed Vireo	16	14	21	6	8	5	6	6	4	22
Rose-breasted Grosbeak	2	2	7	1	2	2	2	0	5	1
Ruby-crowned Kinglet	21	11	12	12	28	29	53	49	21	46
Ruby-thr. Hummingbird	0	0	0	0	3	1	1	0	1	1
Ruffed Grouse	0	0	0	0	0	0	0	0	0	1
Savannah Sparrow	2	5	4	0	0	29	10	1	2	1
Sharp-shinned Hawk	0	0	2	0	1	2	0	2	2	4
Slate-colored Junco	31	65	11	29	14	17	24	41	32	130
Song Sparrow	2	1	2	1	1	5	5	5	13	16
Sparrow sp.	0	2	0	0	0	0	0	0	0	0
Swainson's Thrush	8	6	15	11	29	10	23	34	11	23
Swamp Sparrow	1	0	0	0	0	0	0	2	0	1
Tennessee Warbler	164	331	368	223	156	100	60	38	87	58
Townsend's Warbler	3	0	0	0	0	0	0	0	0	0
Traill's Flycatcher	0	20	38	30	35	41	18	17	22	5
Unknown Empidonax sp.	0	0	0	0	1	0	0	0	0	1
Unknown Tyrannidae sp.	0	0	0	0	0	0	0	0	0	1
Veery	0	0	0	0	0	0	0	0	1	0
Warbler sp.	0	0	0	0	0	0	0	0	1	0
Warbling Vireo	24	21	51	25	18	16	11	23	7	24
Western Flycatcher	0	0	0	0	0	0	0	2	0	0
Western Palm Warbler	6	16	7	5	4	2	5	3	4	8
Western Tanager	0	0	1	0	1	0	0	0	1	1
Western Wood-pewee	0	2	0	1	1	1	1	0	1	0
White-breasted Nuthatch	1	0	0	1	0	1	0	2	1	5
White-crowned Sparrow	6	7	0	4	3	3	3	8	0	30
White-throated Sparrow	7	5	5	8	6	14	6	14	7	38
Wilson's Warbler	22	15	52	41	71	17	37	30	23	25
Winter Wren	0	0	0	0	0	2		3	0	0
Yellow Warbler	297	428	970	424	528	274	113	49	98	65
Yellow-bellied Flycatcher	1	1	0	2	0	1	1	3	3	1
Yellow-bellied Sapsucker	0	0	0	0	2	2	3	6	3	0
Yellow-shafted Flicker	0	0	0	1	1	4	2	1	0	0
TOTAL	***1820***	***3862***	***2742***	***1731***	***2095***	***1734***	***1315***	***975***	**1256**	**1967**

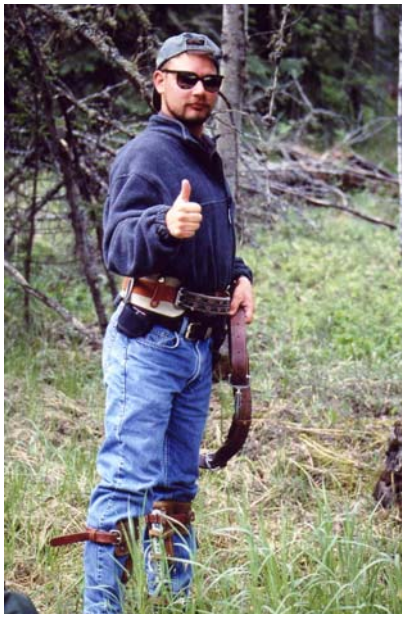
Appendix C. Species recorded on point counts during MAPS at Beaverhill Lake 2002-2006.

Species	2002	2003	2004	2005	2006
Alder Flycatcher	X	X	X	X	X
American Avocet	X	X	X		
American Bittern		X		X	X
American Coot		X		X	X
American Crow	X	X	X	X	X
American Goldfinch	X	X	X	X	X
American Redstart				X	
American Robin	X	X	X	X	X
American White Pelican					
Baltimore Oriole	X	X	X	X	X
Barn Swallow					X
Black Tern		X			X
Black-billed Magpie		X	X		X
Blackbird sp.		X	X		
Black-capped Chickadee	X	X	X	X	X
Black-crowned Night Heron					
Blue-headed Vireo	X				
Blue-winged Teal				X	X
Brewer's Blackbird				X	
Brown-headed Cowbird	X	X	X	X	X
Canada Goose	X	X	X		X
Cedar Waxwing	X	X		X	X
Clay-colored Sparrow	X	X	X	X	X
Common Raven	X	X	X	X	X
Common Tern		X	X		
Common Yellowthroat	X	X	X		
Dark-eyed Junco					X
Downy Woodpecker		X	X		X
Duck sp.		X	X	X	
Eared Grebe		X			
European Starling		X			
Franklin's Gull	X	X		X	
Great Blue Heron				X	
Great Horned Owl				X	
Goose sp.		X	X		
Gull sp.		X	X	X	
Hairy Woodpecker	X	X	X		
Hermit Thrush	X	X	X	X	X
House Wren	X	X	X	X	X
Killdeer	X			X	X
Least Flycatcher	X	X	X	X	X
Lesser Yellowlegs		X		X	X
Lincoln's Sparrow		X			
Long-eared Owl					X
Mallard	X	X	X	X	X
Marbled Godwit	X	X	X	X	X
Marsh Wren					X
Mourning Dove	X	X	X		X
Northern Flicker					X
Northern Goshawk		X	X		
Northern Harrier	X	X	X		X
Northern Pintail					
Northern Shoveller		X	X		
Ovenbird	X			X	
Peep sp.		X			

Philadelphia Vireo	X			X	X
Pied-billed Grebe		X		X	
Pine Siskin		X		X	
Red-breasted Nuthatch				X	
Red-eyed Vireo	X	X	X	X	X
Red-necked Grebe					
Red-tailed Hawk			X		X
Red-winged Blackbird	X	X	X	X	X
Ring-billed Gull	X	X		X	
Rose-breasted Grosbeak					X
Ruby-throated Hummingbird	X	X	X	X	X
Ruffed Grouse		X	X	X	X
Savannah Sparrow	X	X	X	X	X
Short-eared Owl			X		
Solitary Sandpiper				X	
Song Sparrow	X	X	X	X	X
Sora		X	X	X	X
Sprague's Pipit	X	X			X
Swainson's Thrush	X				
Tennessee Warbler				X	X
Tree Swallow	X	X	X	X	X
Veery	X			X	
Vesper Sparrow		X			
Warbling Vireo	X	X	X	X	X
Western Grebe					
White-throated Sparrow	X	X		X	X
Willet	X	X	X		X
Wilson's Snipe	X	X	X	X	X
Woodpecker sp.				X	
Yellow Warbler	X	X	X	X	X
Yellow-bellied Sapsucker		X	X	X	X
Yellow-headed Blackbird		X	X	X	X
Yellowlegs sp.		X			
Number of Species	**41**	**60**	**45**	**50**	**51**

Appendix D. Photos of Beaverhill Bird Observatory work and area.

Top left – dry lake bed (2006), top right - author with Short-eared Owl (2004). Middle left – opening of Beaverhill Bird Observatory with Minister Don Sparrow (1987), middle right – lab opening, bottom left – friends and volunteers of Beaverhill Bird Observatory (1999), bottom right – aspen trees near lab in 2006.



Top left, release of a Northern saw-whet Owl; top right, banders getting the job done (1998); middle left keeping the roof on (2005); middle right, Janos Kovacs cooking up some Hungarian crepes for the BIG Birding Breakfast (2004); bottom left, raptor banders know they're cool; bottom right, family visiting from Japan (2003).

Top left, Father Larry bands an adult male bluebird (2004); top right, Enrique Valdez and family from Mexico (2005); middle left, volunteers cook up steaks and the Steaks and Saw-whets event (2006);, middle right, display at the annual Bluebird Festival at Ellis Bird Farm (2006); bottom left, baby's first bird; bottom right, executive meeting 2005.