

BOARDMAN RIVER FEASIBILITY STUDY

An Interim Report on Boardman River Wildlife Data

DRAFT

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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Introduction	1
Review of Existing Wildlife Data and Sources; Boardman River Corridor	2
Threatened and Endangered Species	2
Amphibians and Reptiles	3
MDNR Michigan Frog and Toad Survey	3
Michigan State University Museum, Jim Harding.....	3
Northwest Michigan College, Dr. Bill Scharf.....	3
Birds	3
Michigan Breeding Bird Atlas	3
North American Breeding Bird Survey	4
Annual Michigan Waterfowl Surveys, MDNR Wildlife Division.....	4
Northwest Michigan College, Dr. Bill Scharf.....	5
Grand Traverse Audubon Club	5
Michigan Loon Preservation Association	6
MDNR Wildlife Division, Jerry Weinrich	6
Brown Bridge Eagles.....	6
Boardman Pond and Brown Bridge Nesting Loons.....	6
Mammals	6
Grand Traverse Band of Ottawa and Chippewa Indians, Furbearer Survey.....	6
Michigan Department of Natural Resources Wildlife Division	7
University of Michigan and Michigan State University Mammalogists.....	7
Wildlife Surveys and Data Collected; Summer 2007.....	8
Amphibians and Reptiles	8
Frogs and Toads.....	8
Salamanders.....	9
Turtles.....	9
Snakes.....	9
Lizards	9
Birds	9
Waterfowl	9
Songbirds.....	11
Water birds.....	11
Birds of Prey	11
Mammals	12

Wildlife Management Issues	14
Potential Habitat Changes Resulting from Dam Removal.....	14
Species Sensitive to Habitat Change.....	15
Threatened and Endangered Species	15
Common Loon	15
Bald Eagle.....	15
Trumpeter Swans.....	16
Red-Shouldered Hawk	16
Wood Turtle	16
Blanding's Turtle	16
Amphibians and Reptiles	17
Leopard Frog	17
Common Snapping Turtle	17
Birds	17
Mammals	17
Fish Passage, Invasive Species, and Contaminants	18
Summary	19
References	20
Appendices	21
<i>Boardman River Existing Wildlife Data</i>	
Appendix A - Threatened and Endangered Species in the Boardman River Watershed; Michigan Natural Features Inventory	22
Appendix B - Michigan Breeding Bird Atlas II - Grand Traverse County; Kalamazoo Nature Center.....	23
Appendix C - North American Breeding Bird Survey - Grand Traverse County; United States Geological Survey	58
Appendix D - Furbearer Survey - Grand Traverse Band of Ottawa and Chippewa Indians	65
<i>Boardman River Wildlife Surveys</i>	
Appendix E - Boardman River Frog and Toad Survey 2007	66
Appendix F - Boardman River Waterfowl Survey 2007	67
Appendix G - Boardman River Breeding Bird Survey 2007 (Daily)	68
Appendix G - Boardman River Breeding Bird Survey 2007 (Summary).....	75
Appendix H - Boardman River Bird Species and Surveys	76
Appendix I - Boardman River Small Mammal Survey 2007	81
Appendix J - Mammals of the Grand Traverse Region	83
Appendix K - Reptiles and Amphibians of the Grand Traverse Region	84

INTRODUCTION

In support of the Boardman River Dams Committee effort to evaluate the fate of the four existing dams on the Boardman River, the Grand Traverse Band of Ottawa and Chippewa Indians, contracted with Environmental Consulting and Technology, Inc. (ECT) to inventory and review existing data on Boardman River wildlife to determine its adequacy for evaluating alternatives for removal of dams on the Boardman River in Grand Traverse County. Except for threatened and endangered species, existing data was found to be too regional in nature and inadequate to identify the current conditions and the wildlife species that occur locally within the river corridor project area. Wildlife surveys were designed to fill these data gaps. Beginning in early April and ending in late July, systematic surveys were completed on reptiles and amphibians, birds and mammals. Surveys were located within the major and important wildlife habitats along the natural, free-flowing river and within or adjacent to the four impoundments. These surveys were designed to identify which wildlife species use the project area and their relative abundance, but not absolute population levels. This report is intended to record what was found to date, and to describe main data sources and their relevant content, plus provide discussion on wildlife management issues, in an effort to provide background information helpful to the Boardman River Dams Committee. Analysis of all wildlife data and an assessment of potential impacts to wildlife habitats from the various dam removal alternatives, and subsequent changes in wildlife, will be the focus of the next phase of this study. Funding for future work has not been secured.

REVIEW OF EXISTING DATA ON THE BOARDMAN RIVER CORRIDOR

Twenty-one individuals from state and federal natural resource agencies, universities, conservation organizations, businesses, and nature centers were identified by the BRDC Technical committee and wildlife consultants as potential sources of data on the wildlife resource within the 500 foot corridor project area. We contacted these sources along with many of the other references identified by these sources.

The existing wildlife data that has been collected is summarized in the appendices of this report. Main sources, agencies and individuals, of existing wildlife data we collected and their general content is described below, listed by major wildlife group. The most complete wildlife data collected specific to the river corridor study area was for threatened, endangered and special concern species. Information and existing data we collected and reviewed on other amphibians and reptiles, birds and mammals was of a much more general nature. This data on other species will be helpful in clarifying species presence/absence and habitat preferences in the region, less so in assessing local conditions and potential effects of water management or dam removal alternatives.

Threatened and Endangered Species

Known occurrences of state and federally listed threatened and endangered (T/E) species were obtained from the Michigan Natural Features Inventory (MNFI), Michigan Loon Preservation Association (MLPA), and the Michigan Department of Natural Resources (MDNR). This included species protected and listed under the Michigan Endangered Species Act; species listed with a status of “threatened” and “endangered” have legal protection under the law, “special concern” species do not.

Known occurrences of T/E species within the project area included the common loon, the bald eagle, and red-shouldered hawk, all listed as “threatened species”, and the wood turtle, listed as a species of “special concern.” No listed “endangered species” were included. The MNFI data we received covered the entire Boardman River watershed including parts of Kalkaska County. It appears in Appendix A.

Common loons have been recorded on Brown Bridge and Boardman Pond impoundments. Loons nested there in several previous years and were active this summer. Loons are often seen on Boardman Lake in the summer months but nesting has not been confirmed. MNFI records of nesting loons within the watershed also include lakes northeast of the project area such as Spider (last recorded 1995), Arbutus (2001) and Rennie (2003).

The bald eagle nesting territory in the project area is identified by MNFI to be upstream from the upper end of Brown Bridge impoundment. This eagle pair was successful in producing young in 2006 (MDNR). Eagles were observed on the nest in March 2007 by MDNR but not during two MDNR aerial eagle surveys in April and June 2007. The territory was considered unsuccessful by MDNR in 2007.

Two red-shouldered hawk occurrence records are located within a mile of the project area approximately midway between Brown Bridge and Boardman ponds. The two records are dated as last observed in 2004. (This medium-sized *buteo* is a species that historically nested in larger blocks of lowland hardwood forests such as those found along rivers. Their decline has been attributed to loss of this habitat type. Much of their foraging is in wetland edges and along rivers. Their nesting territory is often near these riparian habitats. Amphibians and reptiles make up an important part of their diet.)

The two wood turtle MNFI element occurrence records are dated 1991 and 2005. These are sited on the mainstream between Brown Bridge dam and Boardman Pond. (Wood turtles are a secretive species, they prefer cold water stream habitats, i.e., moving water habitats. Their decline has been attributed to incidental, illegal collection, heavy nest predation, especially raccoons, and habitat degradation by human development, principally roadways, dams, and home development).

Amphibians and Reptiles

MDNR Michigan Frog and Toad Survey – Lori Sargent

MDNR Wildlife Division, Natural Heritage Program coordinates this survey. It is a statewide survey initiated as a pilot project in 1988 to increase knowledge of frog and toad abundance and distribution, long term intent to monitor populations statewide. It became a permanent survey and expanded statewide in 1996. Lori Sargent, wildlife biologist in Lansing, is coordinator of these surveys. She provided data from 2004, 2005, and 2006 for 7 survey routes (#244, 331, 346, 377, 386, 439, 457) in Grand Traverse County, and 2 survey routes for Antrim and one for Benzie County. One of these routes, number 331, included wetlands in T26N, R10W (sections 16 and 17), a township which includes the river corridor in the vicinity of Brown Bridge impoundment.

Michigan State University (MSU) – Jim Harding

Jim Harding is the herpetologist at the Michigan State University Museum and a professor of zoology at MSU. He is a leading expert on the reptiles and amphibians (herptiles) of Michigan. He has written separate field guides on Michigan frogs and toads, salamanders, and turtles, and teaches herpetology in the MSU Department of Zoology. One of his ongoing long term research studies involves the wood turtle in northern Michigan.

Jim Harding was not aware of any research or surveys completed on herptiles within the Boardman River corridor. He helped us confirm which species would likely be present in the watershed, and also discussed potential effects of dam removal on reptiles and amphibians as to which would benefit from riverine (moving water) habitat conditions, and which would be more successful in the lake-like (still water) conditions found in the impoundments.

Northwest Michigan College (NMC) -- Dr. Bill Scharf

Bill Scharf taught biology and natural history at NMC from 1964 to 1991. He provided herptile information and expertise, and data collected during field work and research during his tenure at NMC.

Birds

Michigan Breeding Bird Atlas I and II, Kalamazoo Nature Center

The Michigan Breeding Bird Atlas (BBA) is the most comprehensive database of breeding birds in Michigan. Its goal is to map the distribution of each of the breeding bird species found in Michigan. The Breeding Bird Atlas is coordinated by the Kalamazoo Nature Center.

Atlas data has been gathered over two, six year periods; Atlas I from 1983 to 1988, Atlas II from 2001 to 2007. The Atlas II database will be completed following the 2007 field season. The Atlas I database includes over 500,000 bird records and was collected by more than 1300 observers. Atlas I confirmed that 233 bird species are breeding birds in Michigan. [The Atlas of Breeding Birds of Michigan](#), a 600 page book published in 1991, summarizes the findings of Atlas I and includes detailed species accounts and distribution maps for all 233 species.

Ray Adams, a KNC ornithologist, has been a project leader during both Atlases and was our main contact. John Brenneman, KNC, is the statistician for the database and provided the existing BBA data in hard copy form for Atlas I, and electronically for Atlas II.

The original land survey system of township, range, and section was chosen as the grid base for the Atlas, and this township grid was then divided into quarter-township (9 square mile) units called Atlas blocks. The BBA data we received that includes the river corridor fell within eight of these quarter township units. A total of 76 species have been confirmed as breeding birds within the quarter townships containing the river corridor during Atlas II, from 2001 to 2006. A sample of the Atlas II spreadsheets we reviewed from KNC are shown in Appendix B.

Atlas data will be helpful in identifying the breeding birds likely to occur within the project area. As received, data does not include habitat types where these species were recorded, but written species accounts found in the Atlas I book will provide necessary life history information plus help us confirm the preferred habitat types for these species.

North American Breeding Bird Survey, United States Geological Survey

The North American Breeding Bird Survey (BBS) is the most comprehensive bird survey in the United States and Canada. 3700 survey routes have been established, approximately 2900 are surveyed annually. The survey is designed to provide continent-wide information on changes to breeding bird populations. Routes are randomly located to sample a wide diversity of habitats representative of the entire region. The data is not a complete count of all birds in an area but is intended to produce an index to relative abundance. Each route follows roadways and is 24.5 miles long with 50 stops at half mile intervals. Observers are skilled birders. Three minutes is spent at each stop recording all species heard or seen within a quarter mile. In Michigan, routes are run in June to hit the peak of the breeding season.

A large number of routes is needed to average out local variations and reduce the effects of sampling error. There are four BBS survey routes located in Grand Traverse County, only two are active, and being run by local volunteers. Route 230, entitled "Mayfield," recorded a total of 75 species in 2005, the most recent year of data available on the BBS Web site. Route 230, is located on the north end of the county, runs east-west crossing the Boardman River at South Airport Road. Route 29, "Skegemog Point," had a total of 72 species in 2005. It runs down the east side of the county, beginning in the northwest corner of Skegemog Lake and running south to the south county line. It crosses the Boardman River near Forks State Forest Campground. Total species recorded for all the routes in Michigan in 2005 was 170. The data sheets from the BBS Web site for these two routes are posted in Appendix C.

Mike DeCapita, Endangered Species Biologist, US Fish and Wildlife Service, Lansing, was the contact for the BBS and provided the Web addresses; www.pwrc.usgs.gov/bbs/ and www.mbr-pwrc.usgs.gov/bbs/bbs.html.

Annual Michigan Waterfowl Surveys, MDNR Wildlife Division

Aerial Spring Breeding Waterfowl Surveys are run each year, usually the last week of April or first week of May. They are coordinated by the waterfowl-wetlands specialist in the MDNR Wildlife Division Lansing office. Karen Cleveland is currently in this position and was our contact. The survey technique was developed for an annual continent-wide waterfowl census completed by the US Fish and Wildlife Service and the Canadian Wildlife Service. The Michigan surveys are located randomly so every part of the state

has an equal chance of being sampled. Flight transects run east-west across the state with waterfowl tallied in 18 mile segments, width of each transect is one quarter mile. Small planes are used and fly about 100 feet above the ground. Two observers each count the waterfowl they see within one eighth of a mile on their side of the plane.

Location of sightings is not ascribed to any landmark such as a wetland or lake, data is totaled for each segment and only localized down to each eighteen mile segment, not to the location where birds were sighted. The survey is intended to provide data on trends in state and regional populations, and ultimately a continent-wide population. This survey is therefore not specific enough to the Boardman River project except to show which species were present in the region.

The transect nearest the project area, number 5803, segment 22, runs east-west entering the Traverse City area southwest of the city on the north end of Long Lake and crosses the Boardman River corridor on the south end of Boardman Lake near Logan's Landing. Data from 1991 to 2007 show buffleheads, mallards and swans being most common, but never abundant (10 to 30 per year average) with black ducks, scaup and ring-necked ducks showing up in very low numbers. The data we received will be archived at ECT.

There also is a mid-winter waterfowl count carried out each year, usually in January, by MDNR Wildlife Division field staff. Karen Cleveland provided the following data for the mid-winter survey for the Boardman River in Grand Traverse County. In 2007, the survey recorded 77 swans, 13 geese and 8 buffleheads; in 2006, totals were 31 swans, 170 geese, 68 mallards, 20 golden-eyes, and 40 buffleheads. Locations on the Boardman River were not identified. The impoundments likely were frozen mid-winter but may have had open water in the inlets or below dams. Local MDNR Wildlife staff will be contacted to find out if this data was recorded to location and this information will be used in the next phase, the analysis phase, of this project.

Northwest Michigan College (NMC) -- Dr. Bill Scharf, biology professor (retired).

Bill Scharf taught biology and natural history for the NMC Biology Department from 1964 to 1991. As part of his research and field work, he involved students in his bird banding program on the Boardman River which was centered at the NMC Appel property south of River Road. With the assistance of a BRDC intern, he put all his bird banding records by species on a disc, all 2700 of them. This NMC banding data will be archived at ECT. It is shown in the column labeled BND, "banding records," in Appendix H and listed by species.

Many of the birds that Bill Scharf banded are migratory songbirds, not common breeding birds in this area. Their presence in the river corridor indicates the value of the river system and its heavy forest cover to migrating songbirds. Riverine habitats such as the brushy habitat on the NMC Appel property are rich in insects (many of them emerging aquatic insects) early in the season providing valuable food resources for migrating birds as well as resident breeding birds. This heavier cover also provides safe harbor while migrating birds rest and refuel for the rest of their migration.

Grand Traverse Audubon Club

The Grand Traverse Audubon Club has coordinated bird surveys and birding trips in the Grand Traverse area for many years including the annual Audubon Christmas bird counts. Some of their bird surveys included sites along the Boardman River. We contacted a member of the Club who leads many of these activities and asked if the data could be made available to this project. No data was offered.

Michigan Loon Preservation Association

The Michigan Loon Preservation Association is a statewide, non-profit organization and an affiliate of the Michigan Audubon Society. MLPA coordinates the Michigan LoonWatch Program in which local volunteers, called Loon Rangers, monitor and protect nesting pairs of loons by alerting lakefront owners and lake users of the presence of loons and their sensitivity to human activity. They put up safety buoys and "Loon Alert" signs around the nest and also build and install artificial nesting islands. Arlene Westhoven, Ferris State University biology professor, has been a statewide coordinator of this program and continues to be active in MLPA. We contacted her for information and updates on the Boardman Pond and Brown Bridge pond loon pairs. She provided names of Loon Rangers for these lakes and also reported that both lakes had new loon nesting islands installed (by the Grand Traverse County Conservation District) and that the loons had used the floating platforms and successfully hatched young this year. The Loon Ranger for Boardman Pond was contacted for updates on the status of that loon pair.

MDNR Wildlife Division, Jerry Weinrich

Jerry Weinrich is a retired MDNR habitat biologist from West Branch. He coordinated the aerial eagle nesting surveys for the Lower Peninsula for the MDNR Wildlife Division for over twenty years before recently retiring. He continues, under contract to MDNR, to do the annual flying to complete these surveys, Mr. Weinrich has also been active in other MDNR endangered species programs including the Kirtland's warbler, loon, piping plover and osprey recovery.

-- Brown Bridge Bald Eagles

Mr. Weinrich is suspicious that the Brown Bridge eagle pair had moved their nest site from a previous site near Indian Lake to the Brown Bridge nest site. When asked to speculate on the effects of removal of the Brown Bridge dam and impoundment, he felt the eagles would not be forced to move because of the remote and secure nature of this nest site, its proximity to public lands, the Education Preserve, and because the eagle territory includes other areas for feeding including the free-flowing river system and the complex of lakes to the north of the nest site. He also noted that eagles have generally become more tolerant of human activity in recent decades, shown by many of them selecting nest sites close to cottages, subdivisions and roads.

-- Boardman Pond and Brown Bridge Nesting Loons

Mr. Weinrich was asked to speculate whether there were other sites for the loons to move to if either of these nesting territories were eliminated by dam removal. He said he considered this question when flying eagle surveys this summer, and looked for protected bays or shorelines on the lakes north of Brown Bridge and along other area lakes that would have suitable loon nesting habitat. He thought there were some potential areas that may be suitable such as a boy scout camp on Rennie Lake that has a natural shoreline.

Mammals

Grand Traverse Band of Ottawa and Chippewa Indians, Brett Fessell and Tom Callison, biologists, personal communication, and furbearer survey.

Biologists from the Grand Traverse Band of Ottawa and Chippewa Indians Department of Natural Resources conducted a predatory furbearing mammal survey in the winters of 2005 and 2006 to determine whether bait stations will accurately determine the abundance of predatory mammals, and to compare bobcat densities between a county open to hunting (Kalkaska) and a protected county (Grand Traverse). Half of the bait stations were in Kalkaska, half in Grand Traverse County. According to GTB biologists, approximately half of the bait stations were near the Boardman River. Scents, dangling grouse wings, and

occasionally road-kills, were used as lures. Photography, tracks and hair trapped by Velcro strips were analyzed to identify the mammals encountered.

Study results showed an abundance of terrestrial predators including the coyote, red fox, gray fox, bobcat, raccoon, opossum, weasels, striped skunk, and pine marten. Additionally, otter and mink were surveyed at stream crossings. Surveying species within this group is problematic in that these species are generally either nocturnal or crepuscular, have large home ranges and travel great distances, are secretive by nature, and are relatively rare in their distribution. Results of this study also point to healthy and abundant populations of these animals in proximity to the Boardman River. The impoundments on the river were not part of the survey. A summary of species trapped and a sample of the GTB database is found in Appendix D.

Michigan Department of Natural Resources, Rich Earle, personal communication

Rich Earle, wildlife habitat biologist, Traverse City field office, was contacted to see what population information or data was available from the project area for game animals such as black bear, white-tailed deer, bobcat, and aquatic furbearers. He advised that any population estimates and most of the data collected by MDNR, such as harvest data for game animals, is not specific to a location; but, rather is collected only on a more general scale, such as the township or county level. He provided a photocopy of the MDNR Grand Traverse County deeryard map which identifies critical deer wintering habitat. These are largely riverine areas, with habitats such as lowland coniferous swamps that provide important thermal cover for deer during periods of severe winter weather. They are also important habitats for black bears and bobcats, and travel corridors for other carnivores such as coyotes, pine martens and river otters.

Most of the riparian habitat near the Boardman River from the River Road and Beitner Road intersection, upstream to the east county line is classified as winter deer habitat by the MDNR. Mr. Earle speculated that removal of Boardman River dams would increase the amount of this white cedar-balsam fir-woody shrub habitat as a result of natural forest succession that would take place on exposed bottomland soils near the river.

Mammalogists, University of Michigan, Museum of Natural History, Michigan State University Museum, personal communications.

Dr. Phil Myers, UM and Dr. Barb Lundrigan, MSU, were contacted for their assistance in identifying any data, or studies, on mammals in the project area. They helped identify which mammal species were likely to occur along the Boardman River. They informed us of a large research project they have been involved in studying the influence of climate change on mammal distribution and movement, and offered to assist with the small mammal survey and live-trapping proposed for the project area. Data from the small mammal survey in the project area will be used in their long term research project on global warming.

WILDLIFE SURVEYS AND DATA COLLECTED, SUMMER 2007

Because the existing data available on wildlife on lands within the 500 foot river corridor was too limited to help in evaluating the effects of various management alternatives for the four dams on the Boardman River, we designed systematic wildlife surveys within the project area using standard survey methods. Surveys were completed April through July 2007. These surveys were located throughout the project area to sample a wide diversity of wildlife habitats, identify which wildlife species occurred locally in these habitats, and to estimate their relative abundance. Limited funding did not allow the more rigorous surveys needed to establish species population levels. Surveys were conducted on amphibians, reptiles, birds and mammals. These surveys and some of their findings are described below.

Amphibians and Reptiles

Frogs and Toads

A systematic survey of frog and toad species was conducted using the standard survey technique developed by the MDNR for the Michigan Frog and Toad Survey. This statewide survey is a cooperative effort carried out by trained volunteers to monitor the status of toads and frogs in Michigan and their habitats. Using the MDNR protocol, we established a survey route having ten wetland sites located in a variety of habitats representative of those found in the region. We visited all sites three evenings, after dark, in April, May and June 2007. At each wetland, the frog and toad species were identified by their breeding calls. Their relative abundance was estimated using a standardized call index value. All miscellaneous observations of frogs and toads were also recorded from locations other than the survey route during all other wildlife surveys and visits to the project area.

The survey route was laid out mostly along roadways and in a diversity of amphibian habitats representative of wetland types found along the natural river course and those within or influenced by the four impoundments. These amphibian habitats included emergent cattail/bulrush marsh, alder/willow/ninebark shrub swamps, ponds with open water pond characteristics and emergent shorelines, flooded grassy meadows, and vernal ponds in roadside ditches. The survey route was located beginning at the upper end of Brown Bridge impoundment downstream to Boardman Lake. Three were sites located on or near Brown Bridge impoundment, three along River Road, one site each on or adjacent to Boardman and Sabin ponds, and two sites on or near upper Boardman Lake.

Species recorded during the Boardman River survey included the northern spring peeper, western chorus frog, wood frog, the gray treefrog, green frog, northern leopard frog, and eastern American toad. Data from this survey appears in Appendix F.

Many observers have been concerned with the increasing rarity and apparent population decline of several of these species. The northern leopard frog has been one of these species, experiencing a serious decline in the upper Midwest including Michigan. It is a species of wet meadows and its breeding habitat is usually wetlands or ponds with more permanent, year round water conditions. Only one of the ten survey sites had leopard frogs, the emergent cattail/bulrush marsh on the south shore of Brown Bridge impoundment east of the boat launch. This site had a healthy population of this rare frog, recording the highest call index value of 3.

Existing data from the seven previously run Michigan Frog and Toad Survey routes in Grand Traverse County reviewed in this study, recorded leopard frogs in only two out of the seventy wetland sites surveyed

in spring 2006. No leopard frogs were recorded in 2006 in the three Michigan Frog and Toad Survey routes (a total of 30 survey sites) in adjacent Antrim and Benzie counties.

Salamanders

Salamander species believed to occur within the river corridor are the redback salamander, the spotted salamander, blue-spotted salamander, and the red-spotted newt. The larger species breed in ponds with semi-permanent water but live most of the year in upland terrestrial habitats with thicker leaf cover or heavy ground cover such as downed woody debris. The small red-spotted newt is an aquatic salamander that spends most of its adult life in ponds or flooded wetlands. These four species are most abundant in and near aquatic habitats that have no or only limited game fish populations. The mudpuppy, another aquatic salamander and the largest salamander in Michigan, has been found in the Boardman Pond (NMC record, Bill Scharf).

Turtles

Turtle species observed during field work or believed to occur along the natural shoreline of the Boardman River include the wood turtle and the eastern painted turtle, both of which could be found in the slower moving stretches of the river. Species believed to be common or occur in the four impoundments include the common snapping turtle, the eastern painted turtle, the map turtle, and the Blanding's turtle, a species of "special concern." Blanding's turtle juveniles will use tag alder and willow wetland habitat adjacent to slow moving streams the first couple years of their lives (Harding, pers. comm.) so they could be found in some sections of the river above the four impoundments.

Snakes

The northern water snake, the eastern garter snake, northern ribbon snake, blue racer, northern brown snake, eastern hog-nosed snake, red-bellied snake, and the smooth green snake are the species believed to be found in the river corridor and the impoundment habitats. The northern water snake is found in riparian habitats, including wetlands. The other species listed above are most common in upland terrestrial areas. Snakes are attracted to habitats with a good habitat structure like downed logs and tree tops and brush which provide safe cover, but also because of the abundant insect life and small mammals that are attracted to these habitats.

No recent records of the Massasauga rattlesnake are known to occur for the Boardman watershed; however, a good population occurs to the north in the Elk Lake – Skegemog Lake area.

Lizards

One lizard, the five-lined skink, has been recorded as occurring in the river corridor near MDNR Sheck's State Forest Campground, which is just north of Brown Bridge impoundment (NMC, Bill Scharf). This species is rare in northern Michigan and like many snakes, when found, is often in areas with local habitat structure such as logs and downed wood or rock piles along habitat edges.

Birds

Waterfowl

The distribution and abundance of ducks, geese and swans on the Boardman river system and its impoundments is not well documented in existing data. Since northwest Lower Michigan does not have a large population of breeding waterfowl, the majority of waterfowl using the region are believed to be migrants. This is particularly true for diving ducks such as redheads and scaup. To determine the

importance of the Boardman River and its lower impoundments to migrating waterfowl, we designed surveys to count waterfowl during the 2007 spring and fall migration periods. Funding limited the surveys to weekly counts on the four impoundments during peak migration this spring. No funding has been secured for the proposed fall migration survey.

Spot checks at road crossings, river access sites, and on reconnaissance canoe trips this spring suggested waterfowl use of the natural, free-flowing portions of the river was minimal and limited to resident ducks such as mallards, wood ducks, and hooded mergansers.

Five waterfowl surveys were conducted on the four impoundments over a six week period in April and May 2007. To get an accurate and complete count, two viewing points were chosen at each impoundment. At Boardman Lake, all waterfowl were counted from Medalie Park, (latitude 44.7356 N, longitude 85.6144W), and because of large flocks of mixed species, Medalie Park counts were verified from the "Doons" assisted living pavilions' lakeside boardwalk on the east shore. At Sabin Pond, counts were taken at the dam, (44.7078N 85.6222W), and combined with observations at the Sabin Pond delta, (44.7002N 85.6209W). At Boardman Pond, separate counts were made at the boat landing near the dam, (44.6978N 85.6223W), and combined or verified with those made near the Lone Pine trailhead, (44.6855N 85.6273W). At Brown Bridge Pond, counts were recorded from the boat landing on the west end, (44.6432N 85.5074W), and the viewing platform overlooking the east bay and its inlet-delta area, (44.6488N 85.4895W).

A total of 2167 waterfowl were counted during all surveys; seventy-two percent were recorded on Boardman Lake, fifteen percent on Brown Bridge, ten percent on Sabin and three percent on Boardman Pond. We believe that the majority of the ducks were migrating ducks since diving ducks made up 83 percent of the survey count. Diving ducks included redheads (the most abundant species) and buffleheads, lesser and greater scaup, golden-eyes, and American mergansers. Only a few dabbling ducks, including mallards, black ducks, pintails, blue-winged and green-winged teal, wood ducks and northern shovelers, were mixed in these multi-species flocks.

Diving ducks were rafted up in open water areas and observed actively feeding, presumably on aquatic plants and invertebrates. The dabbling ducks were more scattered, in small groups of mated pairs, loafing and feeding in nearby shallow shoreline areas. Two to four mated pairs of Canada geese and mute swans were observed during each survey at Boardman Lake, along with small flocks of Canada geese.

Brown Bridge was the other impoundment that had high waterfowl use, also mostly migratory diving ducks. As with Boardman Lake, waterfowl were concentrated in open water almost exclusively in the upper end an eighth mile or so off shore from the inlet. Buffleheads were the most abundant species at Brown Bridge, making up 237 of the 326 (73%) of waterfowl counted there, with small groups of ring-necked ducks and golden-eyes mixed in among the flocks of buffleheads. These diving ducks were observed actively feeding during the surveys. Mated pairs of wood ducks and mallards were observed along the delta and its associated marsh habitat.

Common loons were observed on Boardman Lake, Boardman Pond and Brown Bridge pond. Boardman Pond and Brown Bridge pond had active nesting loons, both pairs hatched young. Nesting mute swans were observed on all impoundments except Brown Bridge. A pair of trumpeter swans, a reintroduced species, was observed throughout the survey period on Brown Bridge pond. The male from this pair was observed aggressively chasing nesting Canada geese. This territorial behavior likely was a reason mute

swans were absent from Brown Bridge pond. The trumpeter swans were observed through mid-October. (Trumpeters do not nest until two or three years of age; it could be assumed that they have established a nesting territory and if return to Brown Bridge impoundment next season, will likely try to nest.)

We visited the natural lakes north of Brown Bridge impoundment, such as Arbutus, Spring and Spider lakes, during the spring survey period to judge their value to migrating waterfowl. No waterfowl were observed on any of these lakes during these visits.

Based on this one year's data on waterfowl use during spring migration, Boardman Lake and Brown Bridge impoundments appear to be important stopover and refueling areas for migrating waterfowl. Only 13% of waterfowl counted during the spring surveys were observed on Sabin and Boardman ponds (10% and 3%, respectively), with buffleheads being the primary duck species on these two impoundments. Sabin Pond had the highest use by Canada geese of the four impoundments, accounting for 61% of the Canada geese recorded in the spring surveys. A summary of total waterfowl recorded in each impoundment appears in Appendix F.

Songbirds

It is common knowledge among forest ecologists that forested riparian and riverine systems such as those found along the Boardman River have a higher diversity of plants and animals than most other forest habitat types. The biological richness of riparian habitats creates a wide diversity of niches and homes for a wide variety of wildlife, particularly songbirds. To survey birds living along the Boardman River corridor, birds were surveyed using a proven census technique called "point counts". This is similar to the method used for the USGS Breeding Bird Survey described earlier in this report with surveys being conducted during the breeding season and individual species identified by male territorial songs, or visually.

We sampled thirteen survey sites in a variety of habitats along the river corridor. The species recorded during this survey totaled 77. Recorded species are shown in Appendix H in the column marked "BBS," (breeding bird survey).

Water Birds

Water birds such as herons, gulls, terns, and shorebirds were recorded during the spring waterfowl surveys and other visits to the project area. We observed green herons leaving the same woodlot area in the Sabin Pond delta area on several surveys, and suspect that a small nesting colony may occur here. Caspian terns were observed loafing and feeding in the delta area on Brown Bridge pond in mid-summer. Ring-billed gulls and herring gulls were commonly observed on Boardman Lake. Spotted sandpipers and killdeers were observed feeding at the newly exposed Boardman Pond bottomlands and riverbanks, and at the Brown Bridge delta. One great blue heron rookery was recorded by MNFI to be within the Boardman River watershed but the location is out of the project area in Kalkaska County.

Birds of Prey

The birds of prey observed during 2007 wildlife surveys within the project area included the Cooper's hawk, goshawk and broad-winged hawk, bald eagle and turkey vulture. We found an active broad-winged hawk nest near the Brown Bridge impoundment when doing the small mammal trapping in mid-July 2007. MNFI data indicated occurrence records for the red-shouldered hawk just south of the river corridor in the central portions of the project area. Other hawk species that are known to occur as breeding birds in this region

are the sharp-shinned hawk, red-tailed hawk, northern harrier, American kestrel, and merlin. Owl species believed to be breeding birds in the river corridor include the great horned, barred, sawwhet and screech owl.

Mammals

Information on which mammals occur within the Grand Traverse region was obtained from referenced literature sources, contacts with university mammalogists, and our familiarity with the fauna of northern Michigan. A list of these mammal species is shown in Appendix J. Existing data and information on the occurrence of mammals within the river corridor was not as available, particularly for small mammals such as voles, mice and shrews. (Distribution of these small mammals is more influenced by local habitat conditions than the larger mammals like raccoons, coyotes and bear which have more diverse habitat requirements and larger home ranges. Small mammal abundance will also be more influenced by changes in local habitat conditions and annual food resources.)

To gather data on small mammals within the project area, a small mammal survey was designed to determine their relative abundance, distribution and habitat preferences and use. We used a catch-and-release technique using metal Sherman live traps. These box traps were baited with oats and set late evening and checked early morning to minimize attracting larger mammals such as chipmunks and squirrels.

Live trapping occurred in areas near or adjacent to the impoundments and included upland oak-pine-aspen forests and riparian habitats including mixed conifer-deciduous forest types, alder-willow shrub swamp, grassy-herbaceous habitats on riverbanks, and deltas. Four different habitat types were sampled at Brown Bridge, three at Boardman Pond, and three at the upper Sabin Pond delta and marsh. The emergency drawdown on Boardman Pond and its revegetated bottomlands provided an opportunity to study how wildlife and small mammal populations respond to newly created habitat. This area was one of our small mammal survey sites.

On July 15, 220 traps were set in upland and shore zone pine and oak woods near the boat landing at Brown Bridge pond, and another 100 set one mile east from the boat landing along the Brown Bridge Road and shoreline. On July 16, 250 traps were set along the delta boardwalk and along free-flowing stretches of the river adjacent to the Brown Bridge delta and its upstream grass/shrub marsh. On July 23, 60 traps were placed in the newly exposed and revegetated bottomlands of Boardman Pond, and a few were set in adjacent upland and stream-side locations. On July 24, 60 traps were set along the boardwalk of the inlet delta or upper end of Sabin Pond along stream-side locations and among emergent aquatic vegetation. The total trapping effort for the four days was 690 trap-nights. Numbers of traps set and latitude longitude locations are recorded in a spreadsheet submitted on disc to ECT.

The results of this live trapping revealed that white-footed mice (*Peromyscus leucopus*) occur in most of the woodland upland forest types we sampled in the river corridor and even a few in the wetland habitat types. Because the white-footed mouse is a recent immigrant/invaser to northern Lower Michigan, not enough data or knowledge is available to make valid predictions on the habitat types where it is likely to occur in the project area. This southern Michigan mouse is immigrating northward, presumably caused by climate change. According to the University mammalogists, the white-footed mouse is displacing the native and more northerly distributed deer mouse (*Peromyscus maculatus*) in their prime habitat, upland hardwood forests.

Meadow jumping mice appeared, from our live trapping data, to be restricted to habitat close to running water, and usually within sedge or grassy habitat. Most specimens we collected during this survey were trapped within a few meters of streams. Meadow voles were limited mostly to grass-sedge-cattail habitats often where there were freshly sprouted forbs. Meadow voles were found in good numbers in the newly created lush herbaceous habitat on the recently exposed bottomlands at Boardman Pond, indicating their quick response and adaptability to these habitat changes caused by the emergency drawdown. We found the short-tailed shrews habitat preferences less predictable than mice and voles. They appeared to be most common in areas with moist, thick ground vegetation where they had a suitable prey base for their insect and small mammal diets.

Dr. Phil Myers, UM mammalogist, and Dr. Barbara Lundrigan, MSU mammalogist, assisted with the trapping effort at the three Brown Bridge sites, lending their trapping skill and knowledge of small mammal ecology to the project. Dr. Larry Pinto, physiologist from Northwestern University, also helped the first two days. Their help and expertise was greatly appreciated.

WILDLIFE MANAGEMENT ISSUES

The purpose of this report is to summarize data gathered to date on the wildlife resources within the Boardman River project area. The next proposed phase of this wildlife assessment will be an analysis of this data, and an identification of the major effects or impacts various proposed alternatives to the existing Boardman River system will have on wildlife habitats and ultimately on local and regional wildlife populations. Our expertise and familiarity with the ecology of northern Michigan habitats and wildlife along with this collected data will be used in this final analysis. There has been no predetermination that any existing structure will be removed or modified. However, the removal of an existing dam will likely result in the most significant wildlife impacts. Therefore, references to dam removal are used in this section for illustrative purposes only to represent the most significant impacts to existing wildlife populations.

Specific questions that will have to be addressed in future evaluations include:

- What is the impact of removing a dam on existing wildlife habitat and what new habitat will be created?
- Which local wildlife populations would decline and which local wildlife populations would increase due to the habitat change?
- Is this change in wildlife populations of local concern and does it reach beyond the project area.

Potential habitat changes resulting from dam removal alternatives

The obvious changes to wildlife habitat from removal of a dam is the loss of its impounded water or lake-like, slower-moving water conditions and the transition to the river's historic riparian habitats similar to those still found along the free-flowing, unimpounded sections of the river. Wildlife species living in or dependent upon the lake-like conditions will lose habitat, those that prefer the more riverine habitats will gain.

Dam removal will expose impoundment bottomlands which will quickly go through a revegetation process. Wetter sites within these exposed bottomlands will be dominated by moist soil plants such as cattails, bulrushes, spikerushes, arrowhead and mint species, plus non-natives like purple loosestrife. This process could be observed this summer on the drawdown of Boardman Pond and its exposed bottomlands.

Over time, drier soil herbaceous plant species as well as woody tree and shrub species would be expected to replace the early phase emergent cattail-bulrush plant community. Shrub species would also be present in the higher and somewhat drier bottomland soils exposed by a drawdown. Woody species would include tag alder, willows, dogwoods, and ninebark, and tree species like trembling aspen, willow, black cherry, Balm of Gilead, balsam fir, basswood and ash. As the main river channel becomes stabilized, these same species would appear along the newly exposed and narrower riverbank or shoreline habitats. They would be distributed within these habitats largely by their individual requirements for soil moisture and sunlight.

As these habitats change through natural plant succession, wildlife species requiring these different habitat types quickly respond. For example, red-winged blackbirds, the swamp sparrow and American bittern would use the bulrush-cattail habitats and the later succession shrub habitats. The common yellowthroat, yellow warbler, chestnut-sided warbler and golden-winged warbler are species that will move into new

shrubby and younger tree habitats. These species will lose their prominence as forest succession continues and replaces the thicker shrubby habitat types with forest habitats dominated by trees.

Aquatic furbearers, beaver, muskrat, mink and otter, would be affected by dam removal. Beaver and muskrat are present but not common in free flowing portions of rivers such as the Boardman. Species such as mink and otter, and bobcat, would benefit by the connectivity of habitats resulting from dam removal, reconnecting the riverine habitats formerly separated by the impoundments, and eliminating the partial barriers of the flooded or impounded habitats. These mammalian predator species could also lose by the loss of warmwater fish species and amphibians and reptiles that prefer the more lake-like conditions of the impoundments.

Species sensitive to habitat change

This section includes examples of wildlife sensitive to changing habitat conditions caused by dam removal. This information is included to assist in focusing future studies dealing with the evaluation of impacts of various water management alternatives to be considered.

Threatened and Endangered Species

Common Loon

Loons nested on Brown Bridge pond and Boardman Pond in 2007. An important question is what would happen to these two loon pairs if their impoundments were removed, would they move to another lake or impoundment and nest and produce young.

The Michigan Loon Recovery plan states that, "loons are not good at pioneering, that is settling into areas remote from present breeding sites. Such is the case with birds with similar territorial habits and a long, close affiliation of young and parents such as ospreys and bald eagles. It is likely that since loons rarely colonize lakes remote from established nesting areas, young newly-nesting loons seek locations close to where they were reared as chicks."

According to the Loon Recovery Plan, lakes showing the highest potential for loon occupancy are those that range from 16 to 100 acres in size, and have relatively stable water levels, with an island or bog mat, and have relatively pristine conditions on the shoreline. Fish populations with a diversity of age and size classes, and a scarcity of human activity in May and June will enrich this setting. A study of loon populations in the Michigan Upper Peninsula found that loons were more likely to nest on lakes with islands and lower cottage development with fewer than 10 cottages.

There is a complex of a dozen, or so, lakes, just north and east of the Brown Bridge impoundment, and 5-8 miles east of the Boardman Pond impoundment. Some of these lakes, such as Rennie, have less developed, natural shorelines which appear to be suitable for nesting loons (Weinrich, personal communication). A survey of potential loon nesting habitat in the area is needed to clarify effects of dam removal on resident loons.

Bald Eagle

A pair of bald eagles has a nesting territory near the Brown Bridge impoundment, and they undoubtedly forage for food in its inlet and open water. The eagle territory also contains several lakes and the Boardman River and its tributaries. The nest site, according to Jerry Weinrich, MDNR consultant, is in a protected

secluded area and removal of the Brown Bridge dam would likely not force the eagle pair to move. However a closer analysis is needed to determine the sensitivity of the eagle pair to loss of the Brown Bridge impoundment and whether it would affect the breeding success of the eagles.

Trumpeter Swans

A multi-agency reintroduction program, coordinated by MDNR Wildlife Division, has been successful in reestablishing nesting trumpeters to the northern Lower Peninsula. If the pair of trumpeter swans that used the Brown Bridge pond in 2007 returns next spring, we believe they will try to nest. Removal of the impoundment will eliminate their breeding habitat. A survey of potential additional breeding habitat in the area is needed to clarify effects of dam removal on the trumpeter swans. This survey could be done in conjunction with similar habitat surveys for bald eagles and loons.

Red-Shouldered Hawk

This raptor is listed as a threatened species. It has a diet that includes reptiles and amphibians, and forages along the edges of streams, wetlands and lakes. The red-shouldered is not known to nest near the four impoundments. Removal of dams and reservoirs could reduce adjacent wetland and shoreline foraging habitat that is influenced by water levels in the impoundments, such as the Brown Bridge leopard frog wetland and the beaver pond marsh near the delta of Sabin Pond. These wetland habitats would be replaced by riverine forest habitats once the stream bed is reestablished. Riverine habitats, i.e., running water habitats, do not have the prey base of herptiles more abundant along the impoundment shorelines and wetlands. Because the red-shouldered hawks do not nest in the immediate vicinity of the existing Boardman River impoundments, dam removal is not expected to have a significant impact on this species. However, this assumption will be examined in future studies.

Wood Turtle

The wood turtle, a species of special concern, is known to occur in the natural, free-flowing sections of the river between the Brown Bridge and Boardman ponds. According to Jim Harding, MSU herpetologist, the wood turtle is most common in slow-moving, meandering sections of streams. They are not known to use the lake-like habitat found in the Boardman River impoundments, so we do not believe they are present there, and that dam removal is not likely to result in the loss of wood turtle habitat. Wood turtles may be present seasonally in the slow moving inlet or delta areas of Brown Bridge pond. Removing the dams on the Boardman would improve the connectivity of their preferred stream habitat types in some areas of the river. The steep gradients in portions of the streams and the higher velocity of stream flow in areas exposed by dam removal could inhibit movement of the wood turtle while in the stream. Wood turtles are known to disperse from water sources during the summer months and become seasonally terrestrial. This behavior may allow them to move around fast current areas to more suitable habitats. A contiguous habitat of riverine shoreline and/or conditions, after impoundments are removed, improves conditions for the wood turtle, connecting habitats previously disconnected by the impoundments.

Blanding's Turtle

Blanding's turtle is also a species of special concern. Its habitat is found in the shallow waters of the four impoundments, and they are believed to occur there in protected shoreline areas with abundant aquatic vegetation. They wander overland and are frequently killed by vehicles on roads; Blanding's do not reproduce until 12 years of age (DeGraff and Rudis, 1987). The MNFI database does not show their presence in the project area nor did we observe them during our surveys this summer. A specimen was collected in the 1970's at Brown Bridge pond by Bill Scharf, NMC; and Jim Harding, MSU, believes they

would be present elsewhere in the river system. Dam removal will eliminate or reduce their habitat within the river corridor.

Amphibians and Reptiles

Leopard Frog

The leopard frog population has declined throughout much of southern Michigan. We found one healthy breeding population during our frog and toad surveys. It was found in the emergent wetland habitat on the south shore of the Brown Bridge pond impoundment, one quarter to half mile east of the dam. Removal of the Brown Bridge dam may significantly reduce or eliminate this breeding population. The availability of suitable permanent wetland habitat near Brown Bridge pond should be investigated in the next phase of this project to assess the impact of dam removal to this isolated population of leopard frogs and its regional significance.

Common Snapping Turtle

The snapping turtle is found in diverse aquatic habitat types in the project area. They are a bottom dweller commonly found in habitats with semi-permanent water. They are not commonly found in cold water stream habitat but would be common in the impoundments and their contiguous or associated wetland habitats. Removal of the impoundments would seriously reduce their habitat. Snapping turtles would be much less common in the natural river and the project area except in ponds and other wetlands that are part of the river system but not influenced by water levels in the impoundments. They are quite mobile and leave wetlands seasonally when water levels are low. They would move out of the de-watered impoundment areas and go upland or downriver in search of suitable habitat.

Birds

The number of open water diving ducks, such as redheads, buffleheads, and scaup, using the Boardman River watershed will be reduced significantly if the Boardman Lake and Brown Bridge pond are removed. The shallow, upper ends of these impoundments are productive waterfowl feeding areas. Resident dabbling ducks such as mallards, American black ducks and wood ducks will be less common in the watershed if the impoundments, and their contiguous wetlands, are eliminated or reduced. Migrating waterfowl will be forced to move to suitable habitats outside of the watershed if the impoundments are removed. The regional significance of this habitat change will be reviewed as part of the final phase of this project.

Mammals

Removal of still water conditions in the impoundments if dam removal occurs will impact muskrat and beaver living in the impoundments. Both species will find it difficult to adapt to the change in habitat from the current lake-like conditions to running-water conditions in a free flowing river. While both species can exist in the free flowing river environment, the initial recession of water levels will reduce access to the present herbaceous marsh vegetation, like cattails and submerged plants, required by muskrats, and will, until the woody vegetation becomes restored on the newly created riverine habitats, put the more pond-dwelling beaver at greater distances from their preferred aspen, willow, and tag alder that they depend upon for food and den construction. When the water channels and levels have stabilized and the vegetation on the riverbank has changed to a more riverine forest type, there will be fewer beaver and muskrats than in the former impoundments. And species like river otter and eagles that prey on muskrats will have a less diverse food source.

Fish Passage, Invasive Species, and Contaminants

Removal of dams or adding fish ladders would allow for the potential movement of Great Lakes bioaccumulated contaminants into the wildlife food chains within the Boardman River watershed. Allowing passage of exotic organisms and fostering the introduction of bioaccumulated toxins into the Boardman River, a relatively untainted ecosystem, through improved fish passage could have negative consequences to wildlife and watershed.

This issue needs further study and clarification, and is important and relevant to the BRDC decision making process regarding fish passage and the consequences to wildlife, and the fate of the four dams.

SUMMARY

We believe the wildlife data collected and described in this report as well as other recently completed ECT habitat reports provide an adequate baseline to make predictions on potential impacts of the various water management alternatives to local wildlife species and populations. We feel the following additional information will be needed to fully evaluate local and regional impacts of proposed alternatives.

Additional information is needed on:

1. Fall waterfowl use on the four impoundments. Assessing and recording waterfowl use on the impoundments during spring migration and the fall staging and migration periods is needed to assess the importance of these areas to resident and migrating waterfowl. Funding was not available to complete a fall survey in 2007.
2. Habitat available for displaced wildlife species. A survey is needed to find out if suitable breeding and foraging habitat is available, locally and/or regionally, to species that could be displaced by the various water management alternatives. Species of special concern should be the focus initially, and include the common loon, bald eagle, trumpeter swan, red-shouldered hawk, wood and Blanding's turtles, and leopard frog.
3. Introduction of Great Lakes contaminants and introduction of noxious, non-native species. An assessment is needed to determine potential impacts on fish-eating wildlife such as mink, otter, eagles, and loons by improving fish passage and access to non-native species within the Boardman River watershed.

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APPENDICES

Appendix A- Threatened and Endangered Species in the Boardman River Watershed Michigan Natural Features Inventory

Scientific Name	Common Name	Last Observed	Federal Status	State Status	Element Category	TOWN	RANGE	SECTION
Mesic northern forest		31283			Community	25N	11W	11
<i>Gavia immer</i>	Common Loon	2000		T	Animal	25N	11W	12
<i>Gavia immer</i>	Common Loon	1986		T	Animal	26N	07W	7
Rich conifer swamp		31220			Community	26N	09W	10
<i>Dendroica kirtlandii</i>	Kirtland's Warbler	2004	LE	E	Animal	26N	09W	11
<i>Cirsium hillii</i>	Hill's Thistle	2004-summer		SC	Plant	26N	09W	15
Oak-pine barrens		37443			Community	26N	09W	15
<i>Cirsium hillii</i>	Hill's Thistle	33827		SC	Plant	26N	09W	24
<i>Cirsium hillii</i>	Hill's Thistle	19220		SC	Plant	26N	10W	1
<i>Gavia immer</i>	Common Loon	1995-07		T	Animal	26N	10W	2
<i>Gavia immer</i>	Common Loon	2001		T	Animal	26N	10W	9
<i>Gavia immer</i>	Common Loon	2003		T	Animal	26N	10W	12
<i>Haliaeetus leucocephalus</i>	Bald Eagle	37057	LT,PDL	T	Animal	26N	10W	13
<i>Glyptemys insculpta</i>	Wood Turtle	31942		SC	Animal	26N	10W	13
<i>Gavia immer</i>	Common Loon	1998		T	Animal	26N	10W	15
<i>Glyptemys insculpta</i>	Wood Turtle	36721		SC	Animal	26N	11W	14
<i>Buteo lineatus</i>	Red-shouldered Hawk	36697		T	Animal	26N	11W	15
Great Blue Heron Rookery	Great Blue Heron Rookery	28645			Other	27N	07W	20
<i>Dendroica kirtlandii</i>	Kirtland's Warbler	2004	LE	E	Animal	27N	08W	23
Dry-mesic northern forest		31281			Community	27N	09W	24
Northern fen	Alkaline Shrub/herb Fen, Upper Mi	37489			Community	27N	09W	25
<i>Williamsonia fletcheri</i>	Ebony Boghaunter	22800		SC	Animal	27N	09W	31
<i>Cirsium hillii</i>	Hill's Thistle	37083		SC	Plant	27N	09W	35
<i>Haliaeetus leucocephalus</i>	Bald Eagle	2001	LT,PDL	T	Animal	27N	10W	36
<i>Rallus elegans</i>	King Rail	24258		E	Animal	27N	11W	15
<i>Glyptemys insculpta</i>	Wood Turtle	37052		SC	Animal	27N	11W	27
<i>Gavia immer</i>	Common Loon	1995-07		T	Animal	27N	12W	36
<i>Buteo lineatus</i>	Red-shouldered Hawk	36697		T	Animal	28N	06W	30

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Species Name	Count	Evidence	Date	Twp	T-direct	Range	R-direct	Block
Alder Flycatcher	1	X	6/17/2001		26 N		10 W	1
Alder Flycatcher	1	X	6/11/2005		26 N		10 W	1
American Crow	2	V	6/27/2002		26 N		10 W	1
American Goldfinch	2	V	6/27/2002		26 N		10 W	1
American Goldfinch	5	S	6/17/2001		26 N		10 W	1
American Goldfinch	5	S	6/4/2005		26 N		10 W	1
American Goldfinch	17	S	6/29/2004		26 N		10 W	1
American Goldfinch	1	X	6/11/2005		26 N		10 W	1
American Redstart	1	X	6/27/2002		26 N		10 W	1
American Redstart	2	X	6/17/2001		26 N		10 W	1
American Redstart	2	X	6/18/2002		26 N		10 W	1
American Redstart	2	X	6/4/2005		26 N		10 W	1
American Redstart	2	X	6/29/2004		26 N		10 W	1
American Redstart	1	X	6/11/2005		26 N		10 W	1
American Robin	8	X	7/4/2002		26 N		10 W	1
American Robin	12	X	6/27/2002		26 N		10 W	1
American Robin	2	X	6/17/2001		26 N		10 W	1
American Robin	1	X	6/18/2002		26 N		10 W	1
American Robin	4	X	6/4/2005		26 N		10 W	1
American Robin	2	X	6/29/2004		26 N		10 W	1
Bald Eagle	1	V	7/4/2002		26 N		10 W	1
Bald Eagle	1	NY	6/16/2002		26 N		10 W	1
Bald Eagle	1	NY	6/16/2003		26 N		10 W	1
Bald Eagle	1	NY	6/16/2004		26 N		10 W	1
Bald Eagle	1	NY	6/16/2005		26 N		10 W	1
Baltimore Oriole	4	V	7/4/2002		26 N		10 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Baltimore Oriole	2	X	6/4/2005	26 N	10 W	1
Barred Owl	2	T	6/27/2002	26 N	10 W	1
Barred Owl	1	X	6/4/2005	26 N	10 W	1
Belted Kingfisher	2	V	7/4/2002	26 N	10 W	1
Black-and-white Warbler	2	X	7/4/2002	26 N	10 W	1
Black-and-white Warbler	2	X	6/27/2002	26 N	10 W	1
Black-and-white Warbler	1	X	6/4/2005	26 N	10 W	1
Black-capped Chickadee	7	V	7/4/2002	26 N	10 W	1
Black-capped Chickadee	8	V	6/27/2002	26 N	10 W	1
Black-capped Chickadee	4	X	6/17/2001	26 N	10 W	1
Black-capped Chickadee	1	X	6/18/2002	26 N	10 W	1
Black-capped Chickadee	6	S	6/4/2005	26 N	10 W	1
Black-capped Chickadee	5	S	6/29/2004	26 N	10 W	1
Black-capped Chickadee	1	X	6/11/2005	26 N	10 W	1
Black-throated Green Warbler	3	X	7/4/2002	26 N	10 W	1
Black-throated Green Warbler	2	X	6/27/2002	26 N	10 W	1
Black-throated Green Warbler	2	X	6/4/2005	26 N	10 W	1
Black-throated Green Warbler	1	X	6/29/2004	26 N	10 W	1
Blue Jay	8	V	7/4/2002	26 N	10 W	1
Blue Jay	17	V	6/27/2002	26 N	10 W	1
Blue Jay	4	X	6/17/2001	26 N	10 W	1
Blue Jay	5	V	6/4/2005	26 N	10 W	1
Blue Jay	2	V	6/29/2004	26 N	10 W	1
Blue Jay	2	V	6/11/2005	26 N	10 W	1
Blue-headed Vireo	1	X	6/27/2002	26 N	10 W	1
Blue-headed Vireo	1	X	6/29/2004	26 N	10 W	1
Brown Creeper	1	X	6/27/2002	26 N	10 W	1
Brown Thrasher	1	X	6/27/2002	26 N	10 W	1
Brown-headed Cowbird	2	X	6/27/2002	26 N	10 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Brown-headed Cowbird	1	V	6/29/2004	26 N	10 W	1
Canada Goose	8	V	7/4/2002	26 N	10 W	1
Canada Warbler	1	X	7/4/2002	26 N	10 W	1
Canada Warbler	1	X	6/27/2002	26 N	10 W	1
Canada Warbler	1	X	6/18/2002	26 N	10 W	1
Cape May Warbler	2	X	6/11/2005	26 N	10 W	1
Cedar Waxwing	4	V	7/4/2002	26 N	10 W	1
Cedar Waxwing	4	V	6/27/2002	26 N	10 W	1
Cedar Waxwing	5	S	6/17/2001	26 N	10 W	1
Cedar Waxwing	4	X	6/4/2005	26 N	10 W	1
Cedar Waxwing	3	V	6/29/2004	26 N	10 W	1
Chestnut-sided Warbler	1	X	6/11/2005	26 N	10 W	1
Chipping Sparrow	12	X	6/27/2002	26 N	10 W	1
Common Grackle	4	X	6/4/2005	26 N	10 W	1
Common Grackle	5	V	6/29/2004	26 N	10 W	1
Common Grackle	1	V	6/11/2005	26 N	10 W	1
Common Loon	5	FL	6/15/2002	26 N	10 W	1
Common Loon	1	V	6/17/2001	26 N	10 W	1
Common Loon	2	FL	6/4/2005	26 N	10 W	1
Common Loon	1	FL	7/1/2003	26 N	10 W	1
Common Raven	2	V	6/27/2002	26 N	10 W	1
Common Yellowthroat	5	X	7/4/2002	26 N	10 W	1
Common Yellowthroat	4	X	6/17/2001	26 N	10 W	1
Common Yellowthroat	2	X	6/18/2002	26 N	10 W	1
Common Yellowthroat	2	X	6/4/2005	26 N	10 W	1
Common Yellowthroat	4	X	6/29/2004	26 N	10 W	1
Common Yellowthroat	2	X	6/11/2005	26 N	10 W	1
Downy Woodpecker	4	V	6/17/2001	26 N	10 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Downy Woodpecker	1	X	6/4/2005	26 N	10 W	1
Downy Woodpecker	1	V	6/29/2004	26 N	10 W	1
Eastern Bluebird	2	X	6/4/2005	26 N	10 W	1
Eastern Kingbird	2	X	7/4/2002	26 N	10 W	1
Eastern Kingbird	2	X	6/4/2005	26 N	10 W	1
Eastern Phoebe	1	X	6/27/2002	26 N	10 W	1
Eastern Wood-Pewee	1	X	6/11/2005	26 N	10 W	1
Golden-crowned Kinglet	2	V	6/27/2002	26 N	10 W	1
Gray Catbird	1	X	6/18/2002	26 N	10 W	1
Gray Catbird	1	X	6/29/2004	26 N	10 W	1
Great Crested Flycatcher	3	X	7/4/2002	26 N	10 W	1
Great Crested Flycatcher	1	X	6/27/2002	26 N	10 W	1
Great Crested Flycatcher	1	X	6/4/2005	26 N	10 W	1
Great Crested Flycatcher	1	X	6/11/2005	26 N	10 W	1
Hairy Woodpecker	1	V	7/4/2002	26 N	10 W	1
Hairy Woodpecker	2	V	6/4/2005	26 N	10 W	1
Hermit Thrush	2	X	7/4/2002	26 N	10 W	1
Hermit Thrush	1	X	6/4/2005	26 N	10 W	1
House Wren	1	X	6/11/2005	26 N	10 W	1
Indigo Bunting	9	X	6/27/2002	26 N	10 W	1
Indigo Bunting	3	X	6/17/2001	26 N	10 W	1
Indigo Bunting	2	X	6/4/2005	26 N	10 W	1
Indigo Bunting	5	S	6/29/2004	26 N	10 W	1
Indigo Bunting	2	X	6/11/2005	26 N	10 W	1
Killdeer	6	V	7/4/2002	26 N	10 W	1
Magnolia Warbler	1	X	6/27/2002	26 N	10 W	1
Mallard	29	V	7/4/2002	26 N	10 W	1
Mallard	2	V	6/4/2005	26 N	10 W	1
Mourning Dove	5	V	7/4/2002	26 N	10 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Mourning Dove	10	X	6/27/2002	26 N	10 W	1
Mourning Dove	3	X	6/4/2005	26 N	10 W	1
Mourning Dove	2	V	6/29/2004	26 N	10 W	1
Mourning Dove	1	V	6/11/2005	26 N	10 W	1
Mourning Warbler	4	X	6/27/2002	26 N	10 W	1
Mourning Warbler	1	X	6/17/2001	26 N	10 W	1
Mourning Warbler	1	X	6/18/2002	26 N	10 W	1
Mute Swan	2	V	7/4/2002	26 N	10 W	1
Nashville Warbler	1	X	7/4/2002	26 N	10 W	1
Nashville Warbler	10	X	6/27/2002	26 N	10 W	1
Nashville Warbler	3	X	6/4/2005	26 N	10 W	1
Nashville Warbler	1	X	6/11/2005	26 N	10 W	1
Northern Flicker	2	V	7/4/2002	26 N	10 W	1
Northern Flicker	3	V	6/27/2002	26 N	10 W	1
Northern Flicker	1	V	6/17/2001	26 N	10 W	1
Northern Flicker	2	X	6/4/2005	26 N	10 W	1
Northern Rough-winged Swallow	2	V	6/4/2005	26 N	10 W	1
Northern Waterthrush	2	X	6/4/2005	26 N	10 W	1
Ovenbird	3	X	7/4/2002	26 N	10 W	1
Ovenbird	32	X	6/27/2002	26 N	10 W	1
Ovenbird	1	X	6/17/2001	26 N	10 W	1
Ovenbird	2	X	6/18/2002	26 N	10 W	1
Ovenbird	4	X	6/4/2005	26 N	10 W	1
Ovenbird	1	X	6/29/2004	26 N	10 W	1
Ovenbird	4	X	6/11/2005	26 N	10 W	1
Pileated Woodpecker	1	V	7/4/2002	26 N	10 W	1
Pileated Woodpecker	2	V	6/17/2001	26 N	10 W	1
Pileated Woodpecker	1	V	6/4/2005	26 N	10 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Pine Warbler	7	X	7/4/2002	26 N	10 W	1
Pine Warbler	4	X	6/27/2002	26 N	10 W	1
Pine Warbler	3	X	6/17/2001	26 N	10 W	1
Pine Warbler	1	X	6/4/2005	26 N	10 W	1
Purple Finch	1	X	6/4/2005	26 N	10 W	1
Red-bellied Woodpecker	1	V	7/4/2002	26 N	10 W	1
Red-bellied Woodpecker	1	V	6/27/2002	26 N	10 W	1
Red-bellied Woodpecker	1	X	6/4/2005	26 N	10 W	1
Red-eyed Vireo	2	X	7/4/2002	26 N	10 W	1
Red-eyed Vireo	13	s	6/27/2002	26 N	10 W	1
Red-eyed Vireo	2	X	6/17/2001	26 N	10 W	1
Red-eyed Vireo	1	X	6/4/2005	26 N	10 W	1
Red-eyed Vireo	2	X	6/29/2004	26 N	10 W	1
Red-eyed Vireo	2	X	6/11/2005	26 N	10 W	1
Red-shouldered Hawk	1	X	6/4/2005	26 N	10 W	1
Red-shouldered Hawk	1	X	6/4/2005	26 N	10 W	1
Red-shouldered Hawk	1	V	6/29/2004	26 N	10 W	1
Red-winged Blackbird	25	V	7/4/2002	26 N	10 W	1
Red-winged Blackbird	2	X	6/17/2001	26 N	10 W	1
Red-winged Blackbird	3	X	6/11/2005	26 N	10 W	1
Ring-billed Gull	1	O	6/11/2005	26 N	10 W	1
Rose-breasted Grosbeak	5	X	7/4/2002	26 N	10 W	1
Rose-breasted Grosbeak	5	X	6/27/2002	26 N	10 W	1
Rose-breasted Grosbeak	2	X	6/4/2005	26 N	10 W	1
Rose-breasted Grosbeak	1	X	6/11/2005	26 N	10 W	1
Ruby-throated Hummingbird	1	V	6/27/2002	26 N	10 W	1
Ruby-throated Hummingbird	1	V	6/17/2001	26 N	10 W	1
Scarlet Tanager	3	X	7/4/2002	26 N	10 W	1
Scarlet Tanager	3	X	6/27/2002	26 N	10 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Song Sparrow	5	s	7/4/2002	26 N	10 W	1
Song Sparrow	2	X	6/27/2002	26 N	10 W	1
Song Sparrow	1	X	6/17/2001	26 N	10 W	1
Song Sparrow	2	X	6/4/2005	26 N	10 W	1
Song Sparrow	2	X	6/29/2004	26 N	10 W	1
Song Sparrow	1	X	6/11/2005	26 N	10 W	1
Spotted Sandpiper	2	V	7/4/2002	26 N	10 W	1
Swamp Sparrow	5	X	7/4/2002	26 N	10 W	1
Swamp Sparrow	2	X	6/4/2005	26 N	10 W	1
Tennessee Warbler	2	X	6/17/2001	26 N	10 W	1
Tree Swallow	2	V	6/17/2001	26 N	10 W	1
Tree Swallow	4	ON	6/4/2005	26 N	10 W	1
Tufted Titmouse	2	X	6/27/2002	26 N	10 W	1
Tufted Titmouse	2	X	6/4/2005	26 N	10 W	1
Tufted Titmouse	1	X	6/11/2005	26 N	10 W	1
Veery	1	X	6/29/2004	26 N	10 W	1
Warbling Vireo	1	X	6/4/2005	26 N	10 W	1
White-breasted Nuthatch	4	V	7/4/2002	26 N	10 W	1
White-breasted Nuthatch	2	V	6/27/2002	26 N	10 W	1
White-breasted Nuthatch	2	X	6/4/2005	26 N	10 W	1
White-breasted Nuthatch	1	X	6/11/2005	26 N	10 W	1
White-throated Sparrow	3	X	7/4/2002	26 N	10 W	1
White-throated Sparrow	1	X	6/27/2002	26 N	10 W	1
White-throated Sparrow	1	X	6/17/2001	26 N	10 W	1
White-throated Sparrow	1	X	6/29/2004	26 N	10 W	1
White-throated Sparrow	2	X	6/11/2005	26 N	10 W	1
Winter Wren	2	X	7/4/2002	26 N	10 W	1
Winter Wren	1	X	6/4/2005	26 N	10 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Winter Wren	1	X	6/11/2005	26 N	10 W	1
Yellow Warbler	1	X	6/17/2001	26 N	10 W	1
Yellow Warbler	2	X	6/4/2005	26 N	10 W	1
Yellow-bellied Sapsucker	3	V	7/4/2002	26 N	10 W	1
Yellow-bellied Sapsucker	2	V	6/27/2002	26 N	10 W	1
Yellow-bellied Sapsucker	2	X	6/4/2005	26 N	10 W	1
Yellow-billed Cuckoo	1	X	6/27/2002	26 N	10 W	1
Yellow-billed Cuckoo	1	X	6/17/2001	26 N	10 W	1
Yellow-rumped (Myrtle) Warbler	1	X	6/11/2005	26 N	10 W	1
Yellow-throated Vireo	1	X	7/4/2002	26 N	10 W	1
Alder Flycatcher	4	X	6/24/2005	26 N	10 W	2
Alder Flycatcher	2	X	6/11/2005	26 N	10 W	2
Alder Flycatcher	2	X	6/25/2006	26 N	10 W	2
American Crow	3	V	7/4/2002	26 N	10 W	2
American Crow	1	V	6/17/2001	26 N	10 W	2
American Crow	15	V	6/24/2005	26 N	10 W	2
American Crow	2	V	6/29/2004	26 N	10 W	2
American Crow	1	V	6/11/2005	26 N	10 W	2
American Crow	1	V	6/25/2006	26 N	10 W	2
American Goldfinch	5	X	7/4/2002	26 N	10 W	2
American Goldfinch	3	X	6/17/2001	26 N	10 W	2
American Goldfinch	37	S	6/24/2005	26 N	10 W	2
American Goldfinch	5	S	6/29/2004	26 N	10 W	2
American Goldfinch	2	X	6/11/2005	26 N	10 W	2

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

American Goldfinch	2	X	6/25/2006	26 N	10 W	2
American Redstart	1	X	7/4/2002	26 N	10 W	2
American Redstart	1	X	6/18/2002	26 N	10 W	2
American Redstart	19	S	6/24/2005	26 N	10 W	2
American Redstart	10	S	6/25/2006	26 N	10 W	2
American Robin	2	X	7/4/2002	26 N	10 W	2
American Robin	2	X	6/18/2002	26 N	10 W	2
American Robin	54	S	6/24/2005	26 N	10 W	2
American Robin	3	X	6/29/2004	26 N	10 W	2
American Robin	1	X	6/11/2005	26 N	10 W	2
American Robin	10	S	6/25/2006	26 N	10 W	2
Bald Eagle	1	V	6/24/2005	26 N	10 W	2
Bald Eagle	1	V	6/24/2005	26 N	10 W	2
Baltimore Oriole	2	X	7/4/2002	26 N	10 W	2
Baltimore Oriole	13	S	6/24/2005	26 N	10 W	2
Baltimore Oriole	2	X	6/11/2005	26 N	10 W	2
Baltimore Oriole	2	X	6/25/2006	26 N	10 W	2
Bank Swallow	4	V	6/29/2004	26 N	10 W	2
Bank Swallow	1	V	6/11/2005	26 N	10 W	2
Barn Swallow	2	V	6/17/2001	26 N	10 W	2
Barn Swallow	4	V	6/11/2005	26 N	10 W	2
Belted Kingfisher	1	V	7/4/2002	26 N	10 W	2
Belted Kingfisher	3	X	6/24/2005	26 N	10 W	2
Black-and-white Warbler	3	X	7/4/2002	26 N	10 W	2
Black-and-white Warbler	7	S	6/24/2005	26 N	10 W	2
Black-and-white Warbler	1	X	6/11/2005	26 N	10 W	2
Black-and-white Warbler	3	X	6/25/2006	26 N	10 W	2
Black-billed Cuckoo	1	X	6/12/2005	26 N	10 W	2

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Black-billed Cuckoo	1	X	6/25/2006	26 N	10 W	2
Black-capped Chickadee	25	V	7/4/2002	26 N	10 W	2
Black-capped Chickadee	4	X	6/17/2001	26 N	10 W	2
Black-capped Chickadee	2	X	6/18/2002	26 N	10 W	2
Black-capped Chickadee	29	S	6/24/2005	26 N	10 W	2
Black-capped Chickadee	6	S	6/29/2004	26 N	10 W	2
Black-capped Chickadee	2	X	6/11/2005	26 N	10 W	2
Black-capped Chickadee	7	V	6/25/2006	26 N	10 W	2
Black-throated Green Warbler	2	X	7/4/2002	26 N	10 W	2
Black-throated Green Warbler	5	S	6/24/2005	26 N	10 W	2
Black-throated Green Warbler	2	X	6/23/2006	26 N	10 W	2
Blackburnian Warbler	1	X	6/24/2005	26 N	10 W	2
Blue Jay	4	V	7/4/2002	26 N	10 W	2
Blue Jay	15	V	6/24/2005	26 N	10 W	2
Blue Jay	9	V	6/29/2004	26 N	10 W	2
Blue Jay	2	V	6/11/2005	26 N	10 W	2
Blue Jay	5	V	6/25/2006	26 N	10 W	2
Brown Creeper	1	X	7/4/2002	26 N	10 W	2
Brown Thrasher	1	X	6/24/2005	26 N	10 W	2
Brown-headed Cowbird	8	X	6/24/2005	26 N	10 W	2
Brown-headed Cowbird	1	V	6/25/2006	26 N	10 W	2
Canada Warbler	4	X	7/4/2002	26 N	10 W	2
Canada Warbler	1	X	6/12/2005	26 N	10 W	2
Canada Warbler	1	X	6/11/2005	26 N	10 W	2
Cedar Waxwing	18	V	6/24/2005	26 N	10 W	2
Cedar Waxwing	4	V	6/29/2004	26 N	10 W	2
Cedar Waxwing	4	V	6/11/2005	26 N	10 W	2

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Cedar Waxwing	10	V	6/25/2006	26 N	10 W	2
Chestnut-sided Warbler	3	X	6/12/2005	26 N	10 W	2
Chestnut-sided Warbler	4	X	6/25/2006	26 N	10 W	2
Chipping Sparrow	3	X	6/17/2001	26 N	10 W	2
Chipping Sparrow	28	S	6/24/2005	26 N	10 W	2
Chipping Sparrow	5	S	6/29/2004	26 N	10 W	2
Chipping Sparrow	1	X	6/11/2005	26 N	10 W	2
Common Grackle	14	V	6/24/2005	26 N	10 W	2
Common Grackle	3	V	6/11/2005	26 N	10 W	2
Common Grackle	3	V	6/25/2006	26 N	10 W	2
Common Loon	1	O	6/25/2006	26 N	10 W	2
Common Raven	3	V	6/24/2005	26 N	10 W	2
Common Raven	1	V	6/25/2006	26 N	10 W	2
Common Yellowthroat	4	X	7/4/2002	26 N	10 W	2
Common Yellowthroat	2	X	6/17/2001	26 N	10 W	2
Common Yellowthroat	2	X	6/18/2002	26 N	10 W	2
Common Yellowthroat	18	S	6/24/2005	26 N	10 W	2
Common Yellowthroat	3	X	6/11/2005	26 N	10 W	2
Common Yellowthroat	10	S	6/25/2006	26 N	10 W	2
Downy Woodpecker	1	V	7/4/2002	26 N	10 W	2
Downy Woodpecker	3	X	6/24/2005	26 N	10 W	2
Downy Woodpecker	1	V	6/25/2006	26 N	10 W	2
Eastern Bluebird	1	X	6/17/2001	26 N	10 W	2
Eastern Bluebird	2	X	6/18/2002	26 N	10 W	2
Eastern Bluebird	7	S	6/24/2005	26 N	10 W	2
Eastern Bluebird	1	X	6/11/2005	26 N	10 W	2
Eastern Kingbird	6	V	6/24/2005	26 N	10 W	2
Eastern Kingbird	2	X	6/29/2004	26 N	10 W	2
Eastern Kingbird	1	X	6/11/2005	26 N	10 W	2

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Eastern Meadowlark	1	X	6/17/2001	26 N	10 W	2
Eastern Phoebe	1	X	6/12/2005	26 N	10 W	2
Eastern Phoebe	1	X	6/25/2006	26 N	10 W	2
Eastern Wood-Pewee	8	S	6/24/2005	26 N	10 W	2
European Starling	1	V	6/17/2001	26 N	10 W	2
European Starling	12	V	6/12/2005	26 N	10 W	2
European Starling	9	V	6/11/2005	26 N	10 W	2
Field Sparrow	2	X	6/24/2005	26 N	10 W	2
Golden-crowned Kinglet	2	X	6/4/2005	26 N	10 W	2
Golden-crowned Kinglet	1	X	6/23/2006	26 N	10 W	2
Golden-winged Warbler	1	S	6/18/2002	26 N	10 W	2
Golden-winged Warbler	5	S	6/12/2005	26 N	10 W	2
Golden-winged Warbler	3	X	6/25/2006	26 N	10 W	2
Gray Catbird	4	X	6/24/2005	26 N	10 W	2
Gray Catbird	5	S	6/25/2006	26 N	10 W	2
Great Blue Heron	3	V	6/29/2004	26 N	10 W	2
Great Crested Flycatcher	2	X	7/4/2002	26 N	10 W	2
Great Crested Flycatcher	6	S	6/24/2005	26 N	10 W	2
Great Crested Flycatcher	1	X	6/11/2005	26 N	10 W	2
Great Crested Flycatcher	2	X	6/25/2006	26 N	10 W	2
Green Heron	1	V	7/4/2002	26 N	10 W	2
Green Heron	1	X	6/12/2005	26 N	10 W	2
Hairy Woodpecker	3	V	6/24/2005	26 N	10 W	2
Hairy Woodpecker	2	V	6/25/2006	26 N	10 W	2
Hermit Thrush	6	X	7/4/2002	26 N	10 W	2
Hermit Thrush	2	X	6/24/2005	26 N	10 W	2
Hermit Thrush	2	X	6/25/2006	26 N	10 W	2
House Finch	3	X	6/12/2005	26 N	10 W	2
House Wren	1	X	6/18/2002	26 N	10 W	2

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

House Wren	7	S	6/24/2005	26 N	10 W	2
House Wren	1	X	6/11/2005	26 N	10 W	2
Indigo Bunting	1	X	7/4/2002	26 N	10 W	2
Indigo Bunting	6	S	6/17/2001	26 N	10 W	2
Indigo Bunting	20	S	6/24/2005	26 N	10 W	2
Indigo Bunting	7	S	6/29/2004	26 N	10 W	2
Indigo Bunting	2	X	6/11/2005	26 N	10 W	2
Indigo Bunting	6	S	6/25/2006	26 N	10 W	2
Least Flycatcher	1	X	6/17/2001	26 N	10 W	2
Least Flycatcher	4	X	6/24/2005	26 N	10 W	2
Mallard	3	V	6/24/2005	26 N	10 W	2
Mourning Dove	4	V	7/4/2002	26 N	10 W	2
Mourning Dove	2	V	6/17/2001	26 N	10 W	2
Mourning Dove	30	X	6/24/2005	26 N	10 W	2
Mourning Dove	4	V	6/29/2004	26 N	10 W	2
Mourning Dove	4	V	6/11/2005	26 N	10 W	2
Mourning Dove	7	S	6/25/2006	26 N	10 W	2
Mourning Warbler	8	S	6/24/2005	26 N	10 W	2
Mourning Warbler	1	X	6/29/2004	26 N	10 W	2
Mourning Warbler	3	X	6/11/2005	26 N	10 W	2
Nashville Warbler	9	X	7/4/2002	26 N	10 W	2
Nashville Warbler	8	S	6/24/2005	26 N	10 W	2
Nashville Warbler	7	S	6/25/2006	26 N	10 W	2
Northern Cardinal	6	S	6/24/2005	26 N	10 W	2
Northern Cardinal	1	X	6/11/2005	26 N	10 W	2
Northern Cardinal	3	X	6/25/2006	26 N	10 W	2
Northern Flicker	8	V	7/4/2002	26 N	10 W	2
Northern Flicker	3	X	6/24/2005	26 N	10 W	2

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Northern Flicker	1	V	6/29/2004	26 N	10 W	2
Northern Flicker	3	X	6/25/2006	26 N	10 W	2
Ovenbird	19	X	7/4/2002	26 N	10 W	2
Ovenbird	2	X	6/17/2001	26 N	10 W	2
Ovenbird	2	X	6/18/2002	26 N	10 W	2
Ovenbird	20	S	6/24/2005	26 N	10 W	2
Ovenbird	2	X	6/11/2005	26 N	10 W	2
Ovenbird	1	X	6/25/2006	26 N	10 W	2
Pileated Woodpecker	1	V	7/4/2002	26 N	10 W	2
Pileated Woodpecker	5	X	6/24/2005	26 N	10 W	2
Pileated Woodpecker	1	V	6/29/2004	26 N	10 W	2
Pileated Woodpecker	1	X	6/25/2006	26 N	10 W	2
Pine Siskin	2	X	6/24/2005	26 N	10 W	2
Pine Warbler	4	X	7/4/2002	26 N	10 W	2
Pine Warbler	6	S	6/24/2005	26 N	10 W	2
Purple Finch	1	X	7/4/2002	26 N	10 W	2
Purple Finch	1	X	6/12/2005	26 N	10 W	2
Purple Finch	1	X	6/25/2006	26 N	10 W	2
Red-bellied Woodpecker	1	X	6/12/2005	26 N	10 W	2
Red-bellied Woodpecker	1	X	6/25/2006	26 N	10 W	2
Red-breasted Nuthatch	1	V	7/4/2002	26 N	10 W	2
Red-breasted Nuthatch	3	X	6/24/2005	26 N	10 W	2
Red-breasted Nuthatch	1	X	6/25/2006	26 N	10 W	2
Red-eyed Vireo	2	X	7/4/2002	26 N	10 W	2
Red-eyed Vireo	1	X	6/17/2001	26 N	10 W	2
Red-eyed Vireo	16	S	6/24/2005	26 N	10 W	2
Red-eyed Vireo	1	X	6/29/2004	26 N	10 W	2
Red-eyed Vireo	4	X	6/25/2006	26 N	10 W	2
Red-headed Woodpecker	2	X	6/24/2005	26 N	10 W	2

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Red-shouldered Hawk	1	X	6/24/2005	26 N	10 W	2
Red-shouldered Hawk	1	V	6/24/2005	26 N	10 W	2
Red-tailed Hawk	1	V	6/24/2005	26 N	10 W	2
Red-tailed Hawk	1	V	6/29/2004	26 N	10 W	2
Red-winged Blackbird	5	S	6/17/2001	26 N	10 W	2
Red-winged Blackbird	51	S	6/24/2005	26 N	10 W	2
Red-winged Blackbird	1	X	6/29/2004	26 N	10 W	2
Red-winged Blackbird	9	S	6/11/2005	26 N	10 W	2
Red-winged Blackbird	15	V	6/25/2006	26 N	10 W	2
Rose-breasted Grosbeak	3	X	7/4/2002	26 N	10 W	2
Rose-breasted Grosbeak	17	S	6/24/2005	26 N	10 W	2
Rose-breasted Grosbeak	1	X	6/29/2004	26 N	10 W	2
Rose-breasted Grosbeak	1	X	6/25/2006	26 N	10 W	2
Ruby-throated Hummingbird	2	V	6/24/2005	26 N	10 W	2
Ruffed Grouse	1	V	6/24/2005	26 N	10 W	2
Scarlet Tanager	4	X	7/4/2002	26 N	10 W	2
Scarlet Tanager	1	X	6/24/2005	26 N	10 W	2
Song Sparrow	2	X	7/4/2002	26 N	10 W	2
Song Sparrow	2	X	6/17/2001	26 N	10 W	2
Song Sparrow	25	FL	6/24/2005	26 N	10 W	2
Song Sparrow	7	S	6/29/2004	26 N	10 W	2
Song Sparrow	4	X	6/11/2005	26 N	10 W	2
Song Sparrow	5	S	6/25/2006	26 N	10 W	2
Swamp Sparrow	1	X	6/12/2005	26 N	10 W	2
Swamp Sparrow	1	X	6/25/2006	26 N	10 W	2
Tree Swallow	18	V	6/24/2005	26 N	10 W	2
Tree Swallow	3	V	6/29/2004	26 N	10 W	2
Tree Swallow	2	V	6/11/2005	26 N	10 W	2

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Tree Swallow	3	V	6/25/2006	26 N	10 W	2
Tufted Titmouse	9	S	6/24/2005	26 N	10 W	2
Tufted Titmouse	1	X	6/29/2004	26 N	10 W	2
Tufted Titmouse	1	X	6/25/2006	26 N	10 W	2
Turkey Vulture	5	V	6/12/2005	26 N	10 W	2
Turkey Vulture	1	V	6/11/2005	26 N	10 W	2
Veery	5	S	6/24/2005	26 N	10 W	2
Veery	3	X	6/25/2006	26 N	10 W	2
Vesper Sparrow	1	X	6/17/2001	26 N	10 W	2
Vesper Sparrow	4	X	6/24/2005	26 N	10 W	2
Warbling Vireo	1	X	6/17/2001	26 N	10 W	2
Warbling Vireo	2	X	6/24/2005	26 N	10 W	2
Warbling Vireo	1	X	6/29/2004	26 N	10 W	2
Warbling Vireo	2	X	6/11/2005	26 N	10 W	2
Warbling Vireo	1	X	6/25/2006	26 N	10 W	2
White-breasted Nuthatch	5	S	6/24/2005	26 N	10 W	2
White-breasted Nuthatch	3	V	6/25/2006	26 N	10 W	2
White-throated Sparrow	7	X	7/4/2002	26 N	10 W	2
White-throated Sparrow	6	S	6/24/2005	26 N	10 W	2
White-throated Sparrow	1	X	6/29/2004	26 N	10 W	2
White-throated Sparrow	8	S	6/25/2006	26 N	10 W	2
Wild Turkey	1	V	6/24/2005	26 N	10 W	2
Willow Flycatcher	1	X	6/12/2005	26 N	10 W	2
Winter Wren	5	X	7/4/2002	26 N	10 W	2
Winter Wren	1	X	6/18/2002	26 N	10 W	2
Winter Wren	3	X	6/24/2005	26 N	10 W	2
Wood Duck	1	V	6/25/2006	26 N	10 W	2
Yellow Warbler	1	X	7/4/2002	26 N	10 W	2
Yellow Warbler	1	X	6/17/2001	26 N	10 W	2

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Yellow Warbler	3	X	6/24/2005	26 N	10 W	2
Yellow Warbler	3	X	6/25/2006	26 N	10 W	2
Yellow-bellied Sapsucker	2	X	6/24/2005	26 N	10 W	2
Yellow-billed Cuckoo	2	X	7/4/2002	26 N	10 W	2
Yellow-billed Cuckoo	2	X	6/24/2005	26 N	10 W	2
Yellow-billed Cuckoo	1	X	6/25/2006	26 N	10 W	2
Yellow-rumped (Myrtle) Warbler	5	S	6/24/2005	26 N	10 W	2
Yellow-rumped (Myrtle) Warbler	1	X	6/23/2006	26 N	10 W	2
Yellow-throated Vireo	2	X	6/24/2005	26 N	10 W	2
Yellow-throated Vireo	1	X	6/25/2006	26 N	10 W	2
Alder Flycatcher	1	X	6/23/2006	26 N	10 W	3
American Black Duck	2	V	6/16/2005	26 N	10 W	3
American Crow	8	V	6/18/2002	26 N	10 W	3
American Crow	5	V	6/16/2005	26 N	10 W	3
American Goldfinch	6	X	6/18/2002	26 N	10 W	3
American Goldfinch	14	S	6/16/2005	26 N	10 W	3
American Goldfinch	3	X	6/23/2006	26 N	10 W	3
American Redstart	2	X	6/18/2002	26 N	10 W	3
American Redstart	2	X	6/16/2005	26 N	10 W	3
American Redstart	3	X	6/23/2006	26 N	10 W	3
American Robin	8	X	6/18/2002	26 N	10 W	3
American Robin	33	S	6/16/2005	26 N	10 W	3
American Robin	9	S	6/23/2006	26 N	10 W	3
Baltimore Oriole	4	X	6/18/2002	26 N	10 W	3
Baltimore Oriole	7	S	6/16/2005	26 N	10 W	3
Baltimore Oriole	2	X	6/23/2006	26 N	10 W	3
Barn Swallow	3	V	6/18/2002	26 N	10 W	3

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Barn Swallow	2	V	6/16/2005	26 N	10 W	3
Barred Owl	1	X	6/18/2002	26 N	10 W	3
Barred Owl	2	X	6/16/2005	26 N	10 W	3
Barred Owl	1	X	6/23/2006	26 N	10 W	3
Belted Kingfisher	1	X	6/18/2002	26 N	10 W	3
Belted Kingfisher	1	X	6/16/2005	26 N	10 W	3
Belted Kingfisher	1	V	6/23/2006	26 N	10 W	3
Black-and-white Warbler	1	X	6/18/2002	26 N	10 W	3
Black-and-white Warbler	3	X	6/16/2005	26 N	10 W	3
Black-and-white Warbler	2	X	6/23/2006	26 N	10 W	3
Black-capped Chickadee	6	V	6/18/2002	26 N	10 W	3
Black-capped Chickadee	22	S	6/16/2005	26 N	10 W	3
Black-capped Chickadee	13	V	6/23/2006	26 N	10 W	3
Black-throated Blue Warbler	2	X	6/16/2005	26 N	10 W	3
Black-throated Green Warbler	1	X	6/18/2002	26 N	10 W	3
Black-throated Green Warbler	1	X	6/16/2005	26 N	10 W	3
Black-throated Green Warbler	2	X	6/23/2006	26 N	10 W	3
Blue Jay	15	V	6/18/2002	26 N	10 W	3
Blue Jay	14	V	6/16/2005	26 N	10 W	3
Blue Jay	18	V	6/23/2006	26 N	10 W	3
Broad-winged Hawk	1	X	6/23/2006	26 N	10 W	3
Brown Creeper	1	X	6/18/2002	26 N	10 W	3
Brown Creeper	1	X	6/23/2006	26 N	10 W	3
Brown Thrasher	1	X	6/16/2005	26 N	10 W	3
Brown Thrasher	1	X	6/23/2006	26 N	10 W	3
Brown-headed Cowbird	3	X	6/18/2002	26 N	10 W	3
Brown-headed Cowbird	2	X	6/16/2005	26 N	10 W	3
Brown-headed Cowbird	1	V	6/23/2006	26 N	10 W	3

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Canada Goose	5	FL	6/15/2002	26 N	10 W	3
Canada Warbler	3	X	6/16/2005	26 N	10 W	3
Canada Warbler	3	X	6/23/2006	26 N	10 W	3
Cedar Waxwing	16	X	6/18/2002	26 N	10 W	3
Cedar Waxwing	13	V	6/16/2005	26 N	10 W	3
Cedar Waxwing	2	V	6/23/2006	26 N	10 W	3
Chestnut-sided Warbler	1	X	6/18/2002	26 N	10 W	3
Chestnut-sided Warbler	2	X	6/23/2006	26 N	10 W	3
Chipping Sparrow	4	X	6/18/2002	26 N	10 W	3
Chipping Sparrow	2	X	6/23/2006	26 N	10 W	3
Common Grackle	10	V	6/18/2002	26 N	10 W	3
Common Grackle	19	V	6/16/2005	26 N	10 W	3
Common Grackle	18	V	6/23/2006	26 N	10 W	3
Common Yellowthroat	4	X	6/16/2005	26 N	10 W	3
Common Yellowthroat	4	X	6/23/2006	26 N	10 W	3
Cooper's Hawk	1	V	6/23/2006	26 N	10 W	3
Downy Woodpecker	1	X	6/16/2005	26 N	10 W	3
Downy Woodpecker	2	X	6/23/2006	26 N	10 W	3
Eastern Kingbird	4	X	6/18/2002	26 N	10 W	3
Eastern Kingbird	2	X	6/16/2005	26 N	10 W	3
Eastern Kingbird	1	V	6/23/2006	26 N	10 W	3
Eastern Phoebe	1	X	6/18/2002	26 N	10 W	3
Eastern Phoebe	1	X	6/16/2005	26 N	10 W	3
Eastern Phoebe	2	X	6/23/2006	26 N	10 W	3
Eastern Towhee	1	X	6/18/2002	26 N	10 W	3
Eastern Towhee	1	X	6/23/2006	26 N	10 W	3
Eastern Wood-Pewee	1	X	6/16/2005	26 N	10 W	3
Eastern Wood-Pewee	3	X	6/23/2006	26 N	10 W	3
European Starling	9	V	6/16/2005	26 N	10 W	3

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Golden-winged Warbler	1	X	6/18/2002	26 N	10 W	3
Gray Catbird	2	X	6/23/2006	26 N	10 W	3
Great Blue Heron	1	V	6/23/2006	26 N	10 W	3
Great Crested Flycatcher	3	X	6/18/2002	26 N	10 W	3
Great Crested Flycatcher	4	X	6/16/2005	26 N	10 W	3
Great Crested Flycatcher	2	X	6/23/2006	26 N	10 W	3
Green Heron	1	O	6/18/2002	26 N	10 W	3
Hairy Woodpecker	2	V	6/16/2005	26 N	10 W	3
Hermit Thrush	6	X	6/18/2002	26 N	10 W	3
Hermit Thrush	10	S	6/16/2005	26 N	10 W	3
Hermit Thrush	8	S	6/23/2006	26 N	10 W	3
House Finch	4	X	6/16/2005	26 N	10 W	3
House Finch	3	X	6/23/2006	26 N	10 W	3
Indigo Bunting	5	X	6/18/2002	26 N	10 W	3
Indigo Bunting	9	S	6/16/2005	26 N	10 W	3
Indigo Bunting	6	S	6/23/2006	26 N	10 W	3
Killdeer	3	V	6/13/2002	26 N	10 W	3
Killdeer	2	V	6/23/2006	26 N	10 W	3
Least Flycatcher	1	X	6/16/2005	26 N	10 W	3
Least Flycatcher	1	X	6/23/2006	26 N	10 W	3
Mallard	2	V	6/16/2005	26 N	10 W	3
Mallard	1	FL	6/23/2006	26 N	10 W	3
Mourning Dove	15	X	6/18/2002	26 N	10 W	3
Mourning Dove	12	S	6/16/2005	26 N	10 W	3
Mourning Dove	4	X	6/23/2006	26 N	10 W	3
Mourning Warbler	4	X	6/18/2002	26 N	10 W	3
Mourning Warbler	2	X	6/16/2005	26 N	10 W	3
Mourning Warbler	2	X	6/23/2006	26 N	10 W	3
Nashville Warbler	8	S	6/16/2005	26 N	10 W	3

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Nashville Warbler	6	S	6/23/2006	26 N	10 W	3
Northern Cardinal	2	X	6/16/2005	26 N	10 W	3
Northern Cardinal	1	X	6/23/2006	26 N	10 W	3
Northern Flicker	3	X	6/18/2002	26 N	10 W	3
Northern Flicker	1	X	6/16/2005	26 N	10 W	3
Northern Flicker	8	V	6/23/2006	26 N	10 W	3
Northern Rough-winged Swallow	6	V	6/16/2005	26 N	10 W	3
Northern Rough-winged Swallow	2	V	6/23/2006	26 N	10 W	3
Northern Waterthrush	1	X	6/23/2006	26 N	10 W	3
Ovenbird	24	X	6/18/2002	26 N	10 W	3
Ovenbird	4	X	6/16/2005	26 N	10 W	3
Ovenbird	27	S	6/23/2006	26 N	10 W	3
Pileated Woodpecker	2	X	6/16/2005	26 N	10 W	3
Pileated Woodpecker	1	X	6/23/2006	26 N	10 W	3
Pine Warbler	4	X	6/16/2005	26 N	10 W	3
Pine Warbler	1	X	6/23/2006	26 N	10 W	3
Red-bellied Woodpecker	1	X	6/16/2005	26 N	10 W	3
Red-bellied Woodpecker	1	V	6/23/2006	26 N	10 W	3
Red-breasted Nuthatch	1	X	6/18/2002	26 N	10 W	3
Red-breasted Nuthatch	2	X	6/16/2005	26 N	10 W	3
Red-breasted Nuthatch	2	X	6/23/2006	26 N	10 W	3
Red-eyed Vireo	10	X	6/18/2002	26 N	10 W	3
Red-eyed Vireo	13	S	6/16/2005	26 N	10 W	3
Red-eyed Vireo	11	S	6/23/2006	26 N	10 W	3
Red-shouldered Hawk	2	X	6/16/2005	26 N	10 W	3
Red-shouldered Hawk	2	X	6/16/2005	26 N	10 W	3
Red-shouldered Hawk	1	X	6/23/2006	26 N	10 W	3
Red-shouldered Hawk	1	X	6/23/2006	26 N	10 W	3
Red-winged Blackbird	18	X	6/18/2002	26 N	10 W	3

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Red-winged Blackbird	21	S	6/16/2005	26 N	10 W	3
Red-winged Blackbird	14	S	6/23/2006	26 N	10 W	3
Rose-breasted Grosbeak	9	X	6/18/2002	26 N	10 W	3
Rose-breasted Grosbeak	13	S	6/16/2005	26 N	10 W	3
Rose-breasted Grosbeak	1	X	6/23/2006	26 N	10 W	3
Scarlet Tanager	6	X	6/18/2002	26 N	10 W	3
Scarlet Tanager	5	S	6/16/2005	26 N	10 W	3
Scarlet Tanager	5	S	6/23/2006	26 N	10 W	3
Song Sparrow	2	X	6/18/2002	26 N	10 W	3
Song Sparrow	4	X	6/16/2005	26 N	10 W	3
Song Sparrow	8	S	6/23/2006	26 N	10 W	3
Spotted Sandpiper	1	V	6/18/2002	26 N	10 W	3
Tree Swallow	8	V	6/16/2005	26 N	10 W	3
Tree Swallow	10	V	6/23/2006	26 N	10 W	3
Tufted Titmouse	4	X	6/18/2002	26 N	10 W	3
Tufted Titmouse	2	X	6/16/2005	26 N	10 W	3
Tufted Titmouse	3	X	6/23/2006	26 N	10 W	3
Turkey Vulture	1	V	6/16/2005	26 N	10 W	3
Warbling Vireo	1	X	6/18/2002	26 N	10 W	3
Warbling Vireo	1	X	6/16/2005	26 N	10 W	3
White-breasted Nuthatch	3	X	6/16/2005	26 N	10 W	3
White-breasted Nuthatch	2	V	6/23/2006	26 N	10 W	3
White-throated Sparrow	4	X	6/16/2005	26 N	10 W	3
White-throated Sparrow	5	S	6/23/2006	26 N	10 W	3
Wild Turkey	1	V	6/23/2006	26 N	10 W	3
Winter Wren	1	X	6/18/2002	26 N	10 W	3
Winter Wren	6	S	6/16/2005	26 N	10 W	3
Winter Wren	2	X	6/23/2006	26 N	10 W	3

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Wood Thrush	1	X	6/18/2002	26 N	10 W	3
Wood Thrush	2	X	6/16/2005	26 N	10 W	3
Wood Thrush	1	X	6/23/2006	26 N	10 W	3
Yellow Warbler	1	X	6/18/2002	26 N	10 W	3
Yellow Warbler	1	X	6/16/2005	26 N	10 W	3
Yellow-bellied Sapsucker	2	V	6/18/2002	26 N	10 W	3
Yellow-bellied Sapsucker	2	X	6/16/2005	26 N	10 W	3
Yellow-bellied Sapsucker	7	FL	6/23/2006	26 N	10 W	3
Yellow-billed Cuckoo	3	X	6/16/2005	26 N	10 W	3
Yellow-rumped (Myrtle) Warbler	1	X	6/23/2006	26 N	10 W	3
American Crow	11	V	6/23/2004	26 N	10 W	4
American Crow	8	X	6/29/2005	26 N	10 W	4
American Crow	9	B	6/29/2006	26 N	10 W	4
American Goldfinch	21	X	6/23/2004	26 N	10 W	4
American Goldfinch	1	X	6/17/2001	26 N	10 W	4
American Goldfinch	38	S	6/29/2005	26 N	10 W	4
American Goldfinch	1	X	6/29/2004	26 N	10 W	4
American Goldfinch	10	S	6/29/2006	26 N	10 W	4
American Redstart	3	X	6/23/2004	26 N	10 W	4
American Redstart	1	X	6/29/2005	26 N	10 W	4
American Redstart	1	X	6/28/2006	26 N	10 W	4
American Robin	51	X	6/23/2004	26 N	10 W	4
American Robin	66	FL	6/29/2005	26 N	10 W	4
American Robin	1	X	6/11/2005	26 N	10 W	4
American Robin	12	V	6/28/2006	26 N	10 W	4
Baltimore Oriole	5	X	6/23/2004	26 N	10 W	4
Baltimore Oriole	1	V	6/29/2005	26 N	10 W	4

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Baltimore Oriole	1	X	6/29/2006	26 N	10 W	4
Barn Swallow	2	V	6/23/2004	26 N	10 W	4
Barn Swallow	10	V	6/29/2005	26 N	10 W	4
Barn Swallow	5	V	6/29/2006	26 N	10 W	4
Barred Owl	2	X	6/23/2004	26 N	10 W	4
Barred Owl	1	FL	6/29/2006	26 N	10 W	4
Belted Kingfisher	2	X	6/29/2005	26 N	10 W	4
Belted Kingfisher	1	V	6/28/2006	26 N	10 W	4
Black-and-white Warbler	1	X	6/23/2004	26 N	10 W	4
Black-and-white Warbler	1	X	6/29/2005	26 N	10 W	4
Black-and-white Warbler	2	X	6/29/2006	26 N	10 W	4
Black-billed Cuckoo	1	X	6/29/2005	26 N	10 W	4
Black-capped Chickadee	34	X	6/23/2004	26 N	10 W	4
Black-capped Chickadee	62	FL	6/29/2005	26 N	10 W	4
Black-capped Chickadee	33	V	6/27/2006	26 N	10 W	4
Black-throated Green Warbler	2	X	6/23/2004	26 N	10 W	4
Black-throated Green Warbler	3	X	6/29/2005	26 N	10 W	4
Black-throated Green Warbler	1	X	6/29/2006	26 N	10 W	4
Blackburnian Warbler	1	X	6/23/2004	26 N	10 W	4
Blue Jay	26	V	6/23/2004	26 N	10 W	4
Blue Jay	28	X	6/29/2005	26 N	10 W	4
Blue Jay	3	V	6/29/2004	26 N	10 W	4
Blue Jay	19	V	6/27/2006	26 N	10 W	4
Blue-headed Vireo	1	X	6/23/2004	26 N	10 W	4
Blue-headed Vireo	1	X	6/29/2006	26 N	10 W	4
Bobolink	4	X	6/23/2004	26 N	10 W	4
Bobolink	6	S	6/29/2006	26 N	10 W	4
Brewer's Blackbird	2	V	6/29/2005	26 N	10 W	4
Broad-winged Hawk	1	V	6/29/2006	26 N	10 W	4

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Brown Thrasher	5	V	6/29/2005	26 N	10 W	4
Brown Thrasher	1	X	6/27/2006	26 N	10 W	4
Brown-headed Cowbird	11	X	6/23/2004	26 N	10 W	4
Brown-headed Cowbird	3	X	6/29/2005	26 N	10 W	4
Brown-headed Cowbird	1	V	6/29/2006	26 N	10 W	4
Cedar Waxwing	21	X	6/23/2004	26 N	10 W	4
Cedar Waxwing	2	V	6/17/2001	26 N	10 W	4
Cedar Waxwing	22	V	6/29/2005	26 N	10 W	4
Cedar Waxwing	7	V	6/28/2006	26 N	10 W	4
Chipping Sparrow	37	X	6/23/2004	26 N	10 W	4
Chipping Sparrow	41	S	6/29/2005	26 N	10 W	4
Chipping Sparrow	11	S	6/28/2006	26 N	10 W	4
Common Grackle	8	V	6/23/2004	26 N	10 W	4
Common Grackle	6	V	6/29/2005	26 N	10 W	4
Common Grackle	22	V	6/29/2006	26 N	10 W	4
Common Raven	5	V	6/23/2004	26 N	10 W	4
Common Raven	3	X	6/29/2005	26 N	10 W	4
Common Raven	5	V	6/27/2006	26 N	10 W	4
Common Yellowthroat	8	X	6/23/2004	26 N	10 W	4
Common Yellowthroat	11	S	6/29/2005	26 N	10 W	4
Common Yellowthroat	1	P	6/29/2006	26 N	10 W	4
Downy Woodpecker	2	V	6/23/2004	26 N	10 W	4
Downy Woodpecker	1	V	6/17/2001	26 N	10 W	4
Downy Woodpecker	5	V	6/29/2005	26 N	10 W	4
Downy Woodpecker	1	V	6/29/2004	26 N	10 W	4
Downy Woodpecker	2	X	6/27/2006	26 N	10 W	4
Eastern Bluebird	8	X	6/23/2004	26 N	10 W	4
Eastern Bluebird	8	FL	6/29/2005	26 N	10 W	4

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Eastern Bluebird	3	ON	6/28/2006	26 N	10 W	4
Eastern Kingbird	5	X	6/23/2004	26 N	10 W	4
Eastern Kingbird	2	V	6/29/2005	26 N	10 W	4
Eastern Meadowlark	2	X	6/23/2004	26 N	10 W	4
Eastern Meadowlark	5	S	6/29/2005	26 N	10 W	4
Eastern Meadowlark	5	S	6/29/2006	26 N	10 W	4
Eastern Phoebe	2	X	6/23/2004	26 N	10 W	4
Eastern Phoebe	1	X	6/17/2001	26 N	10 W	4
Eastern Phoebe	13	S	6/29/2005	26 N	10 W	4
Eastern Phoebe	4	X	6/28/2006	26 N	10 W	4
Eastern Towhee	3	X	6/23/2004	26 N	10 W	4
Eastern Towhee	2	X	6/29/2005	26 N	10 W	4
Eastern Towhee	4	X	6/27/2006	26 N	10 W	4
Eastern Wood-Pewee	9	V	6/23/2004	26 N	10 W	4
Eastern Wood-Pewee	12	S	6/29/2005	26 N	10 W	4
Eastern Wood-Pewee	1	X	6/28/2006	26 N	10 W	4
European Starling	59	X	6/23/2004	26 N	10 W	4
European Starling	32	V	6/29/2005	26 N	10 W	4
European Starling	43	V	6/28/2006	26 N	10 W	4
Field Sparrow	3	X	6/23/2004	26 N	10 W	4
Field Sparrow	4	X	6/29/2005	26 N	10 W	4
Field Sparrow	4	X	6/27/2006	26 N	10 W	4
Golden-crowned Kinglet	2	X	6/23/2004	26 N	10 W	4
Gray Catbird	1	X	6/11/2005	26 N	10 W	4
Great Blue Heron	1	V	6/29/2004	26 N	10 W	4
Great Crested Flycatcher	4	X	6/23/2004	26 N	10 W	4
Great Crested Flycatcher	7	S	6/29/2005	26 N	10 W	4
Great Crested Flycatcher	4	X	6/28/2006	26 N	10 W	4

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Hairy Woodpecker	2	V	6/23/2004	26 N	10 W	4
Hairy Woodpecker	4	V	6/29/2005	26 N	10 W	4
Hairy Woodpecker	1	V	6/29/2004	26 N	10 W	4
Hairy Woodpecker	1	V	6/27/2006	26 N	10 W	4
Hermit Thrush	17	X	6/23/2004	26 N	10 W	4
Hermit Thrush	41	S	6/29/2005	26 N	10 W	4
Hermit Thrush	26	S	6/27/2006	26 N	10 W	4
House Finch	5	X	6/23/2004	26 N	10 W	4
House Finch	4	X	6/29/2005	26 N	10 W	4
House Finch	2	X	6/29/2006	26 N	10 W	4
House Sparrow	8	X	6/23/2004	26 N	10 W	4
House Wren	1	X	6/23/2004	26 N	10 W	4
House Wren	3	X	6/29/2005	26 N	10 W	4
House Wren	1	X	6/28/2006	26 N	10 W	4
Indigo Bunting	15	X	6/23/2004	26 N	10 W	4
Indigo Bunting	16	S	6/29/2005	26 N	10 W	4
Indigo Bunting	1	X	6/29/2004	26 N	10 W	4
Indigo Bunting	1	X	6/11/2005	26 N	10 W	4
Indigo Bunting	9	S	6/29/2006	26 N	10 W	4
Killdeer	3	V	6/23/2004	26 N	10 W	4
Killdeer	5	X	6/29/2005	26 N	10 W	4
Killdeer	8	V	6/29/2006	26 N	10 W	4
Least Flycatcher	2	X	6/23/2004	26 N	10 W	4
Least Flycatcher	1	X	6/29/2005	26 N	10 W	4
Least Flycatcher	2	X	6/28/2006	26 N	10 W	4
Magnolia Warbler	1	X	6/23/2004	26 N	10 W	4
Mallard	4	V	6/29/2004	26 N	10 W	4
Mourning Dove	18	X	6/23/2004	26 N	10 W	4
Mourning Dove	1	V	6/17/2001	26 N	10 W	4

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Mourning Dove	27	X	6/29/2005	26 N	10 W	4
Mourning Dove	16	V	6/27/2006	26 N	10 W	4
Mourning Warbler	1	X	6/29/2006	26 N	10 W	4
Nashville Warbler	7	X	6/23/2004	26 N	10 W	4
Nashville Warbler	14	S	6/29/2005	26 N	10 W	4
Nashville Warbler	9	S	6/27/2006	26 N	10 W	4
Northern Cardinal	3	X	6/23/2004	26 N	10 W	4
Northern Cardinal	8	S	6/29/2005	26 N	10 W	4
Northern Cardinal	2	X	6/29/2006	26 N	10 W	4
Northern Flicker	3	V	6/23/2004	26 N	10 W	4
Northern Flicker	1	V	6/17/2001	26 N	10 W	4
Northern Flicker	12	FL	6/29/2005	26 N	10 W	4
Northern Flicker	1	V	6/29/2004	26 N	10 W	4
Northern Flicker	1	FL	6/27/2006	26 N	10 W	4
Northern Mockingbird	1	X	6/23/2004	26 N	10 W	4
Ovenbird	54	X	6/23/2004	26 N	10 W	4
Ovenbird	1	X	6/17/2001	26 N	10 W	4
Ovenbird	57	S	6/29/2005	26 N	10 W	4
Ovenbird	29	S	6/27/2006	26 N	10 W	4
Pileated Woodpecker	1	V	6/23/2004	26 N	10 W	4
Pileated Woodpecker	2	V	6/29/2005	26 N	10 W	4
Pileated Woodpecker	1	V	6/27/2006	26 N	10 W	4
Pine Warbler	12	X	6/23/2004	26 N	10 W	4
Pine Warbler	13	S	6/29/2005	26 N	10 W	4
Pine Warbler	4	X	6/29/2006	26 N	10 W	4
Purple Finch	7	X	6/23/2004	26 N	10 W	4
Purple Finch	2	X	6/29/2005	26 N	10 W	4
Purple Finch	2	X	6/28/2006	26 N	10 W	4
Red-bellied Woodpecker	2	V	6/23/2004	26 N	10 W	4

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Red-bellied Woodpecker	2	X	6/29/2005	26 N	10 W	4
Red-breasted Nuthatch	4	X	6/23/2004	26 N	10 W	4
Red-breasted Nuthatch	10	S	6/29/2005	26 N	10 W	4
Red-breasted Nuthatch	3	X	6/28/2006	26 N	10 W	4
Red-eyed Vireo	28	X	6/23/2004	26 N	10 W	4
Red-eyed Vireo	48	S	6/29/2005	26 N	10 W	4
Red-eyed Vireo	1	X	6/11/2005	26 N	10 W	4
Red-eyed Vireo	15	S	6/29/2006	26 N	10 W	4
Red-shouldered Hawk	2	V	6/23/2004	26 N	10 W	4
Red-tailed Hawk	1	V	6/23/2004	26 N	10 W	4
Red-tailed Hawk	1	V	6/29/2005	26 N	10 W	4
Red-tailed Hawk	1	V	6/29/2004	26 N	10 W	4
Red-tailed Hawk	1	X	6/29/2006	26 N	10 W	4
Red-winged Blackbird	15	X	6/23/2004	26 N	10 W	4
Red-winged Blackbird	4	X	6/17/2001	26 N	10 W	4
Red-winged Blackbird	23	S	6/29/2005	26 N	10 W	4
Red-winged Blackbird	1	X	6/29/2004	26 N	10 W	4
Red-winged Blackbird	6	S	6/11/2005	26 N	10 W	4
Red-winged Blackbird	20	S	6/29/2006	26 N	10 W	4
Rose-breasted Grosbeak	16	X	6/23/2004	26 N	10 W	4
Rose-breasted Grosbeak	7	FL	6/29/2005	26 N	10 W	4
Rose-breasted Grosbeak	1	X	6/11/2005	26 N	10 W	4
Rose-breasted Grosbeak	3	X	6/29/2006	26 N	10 W	4
Ruffed Grouse	1	FL	6/29/2006	26 N	10 W	4
Scarlet Tanager	7	X	6/23/2004	26 N	10 W	4
Scarlet Tanager	7	S	6/29/2005	26 N	10 W	4
Scarlet Tanager	11	S	6/27/2006	26 N	10 W	4
Song Sparrow	17	X	6/23/2004	26 N	10 W	4

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Song Sparrow	1	X	6/17/2001	26 N	10 W	4
Song Sparrow	19	FL	6/29/2005	26 N	10 W	4
Song Sparrow	1	X	6/11/2005	26 N	10 W	4
Song Sparrow	16	S	6/29/2006	26 N	10 W	4
Tree Swallow	24	V	6/23/2004	26 N	10 W	4
Tree Swallow	8	V	6/29/2005	26 N	10 W	4
Tree Swallow	4	ON	6/28/2006	26 N	10 W	4
Tufted Titmouse	2	X	6/23/2004	26 N	10 W	4
Tufted Titmouse	1	X	6/17/2001	26 N	10 W	4
Tufted Titmouse	2	X	6/29/2005	26 N	10 W	4
Tufted Titmouse	1	X	6/28/2006	26 N	10 W	4
Turkey Vulture	2	V	6/23/2004	26 N	10 W	4
Turkey Vulture	2	V	6/29/2005	26 N	10 W	4
Turkey Vulture	1	V	6/11/2005	26 N	10 W	4
Veery	1	X	6/23/2004	26 N	10 W	4
Veery	1	X	6/29/2005	26 N	10 W	4
Vesper Sparrow	10	X	6/23/2004	26 N	10 W	4
Vesper Sparrow	12	S	6/29/2005	26 N	10 W	4
Vesper Sparrow	10	S	6/29/2006	26 N	10 W	4
Warbling Vireo	1	X	6/29/2005	26 N	10 W	4
Warbling Vireo	1	X	6/29/2006	26 N	10 W	4
White-breasted Nuthatch	6	X	6/23/2004	26 N	10 W	4
White-breasted Nuthatch	3	X	6/29/2005	26 N	10 W	4
White-breasted Nuthatch	10	V	6/27/2006	26 N	10 W	4
White-throated Sparrow	3	X	6/23/2004	26 N	10 W	4
White-throated Sparrow	2	X	6/29/2006	26 N	10 W	4
Wild Turkey	1	V	6/23/2004	26 N	10 W	4
Wild Turkey	2	V	6/28/2006	26 N	10 W	4

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Willow Flycatcher	1	X	6/29/2006	26 N	10 W	4
Winter Wren	1	X	6/29/2005	26 N	10 W	4
Wood Duck	1	V	6/29/2004	26 N	10 W	4
Wood Thrush	4	X	6/23/2004	26 N	10 W	4
Yellow Warbler	1	X	6/23/2004	26 N	10 W	4
Yellow-bellied Sapsucker	2	V	6/23/2004	26 N	10 W	4
Yellow-bellied Sapsucker	5	X	6/29/2005	26 N	10 W	4
Yellow-bellied Sapsucker	2	V	6/28/2006	26 N	10 W	4
Yellow-billed Cuckoo	1	X	6/23/2004	26 N	10 W	4
Yellow-billed Cuckoo	2	X	6/29/2005	26 N	10 W	4
Yellow-billed Cuckoo	3	X	6/27/2006	26 N	10 W	4
Yellow-rumped (Myrtle) Warbler	6	X	6/23/2004	26 N	10 W	4
Yellow-rumped (Myrtle) Warbler	5	S	6/29/2005	26 N	10 W	4
Yellow-rumped (Myrtle) Warbler	10	S	6/27/2006	26 N	10 W	4
Yellow-throated Vireo	1	X	6/28/2006	26 N	10 W	4
Alder Flycatcher	1	X	6/11/2005	26 N	11 W	1
American Crow	2	V	6/17/2001	26 N	11 W	1
American Crow	1	V	6/29/2004	26 N	11 W	1
American Crow	5	V	6/11/2005	26 N	11 W	1
American Goldfinch	4	X	6/17/2001	26 N	11 W	1
American Goldfinch	11	S	6/29/2004	26 N	11 W	1
American Goldfinch	10	S	6/11/2005	26 N	11 W	1
American Kestrel	3	V	6/11/2005	26 N	11 W	1
American Redstart	1	X	6/18/2002	26 N	11 W	1
American Robin	3	X	6/17/2001	26 N	11 W	1
American Robin	3	X	6/18/2002	26 N	11 W	1
Bank Swallow	4	V	6/11/2005	26 N	11 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Barn Swallow	12	V	6/29/2004	26 N	11 W	1
Black-capped Chickadee	1	X	6/17/2001	26 N	11 W	1
Blue Jay	1	X	6/17/2001	26 N	11 W	1
Blue Jay	2	V	6/29/2004	26 N	11 W	1
Blue Jay	3	V	6/11/2005	26 N	11 W	1
Bobolink	1	X	6/17/2001	26 N	11 W	1
Brown-headed Cowbird	2	V	6/17/2001	26 N	11 W	1
Brown-headed Cowbird	1	V	6/11/2005	26 N	11 W	1
Cedar Waxwing	8	S	6/17/2001	26 N	11 W	1
Cedar Waxwing	2	V	6/29/2004	26 N	11 W	1
Chipping Sparrow	1	X	6/17/2001	26 N	11 W	1
Chipping Sparrow	2	X	6/29/2004	26 N	11 W	1
Chipping Sparrow	1	X	6/11/2005	26 N	11 W	1
Cliff Swallow	14	V	6/17/2001	26 N	11 W	1
Common Grackle	3	V	6/17/2001	26 N	11 W	1
Common Grackle	5	V	6/29/2004	26 N	11 W	1
Common Grackle	6	V	6/11/2005	26 N	11 W	1
Common Yellowthroat	2	X	6/17/2001	26 N	11 W	1
Common Yellowthroat	2	X	6/29/2004	26 N	11 W	1
Downy Woodpecker	2	V	6/29/2004	26 N	11 W	1
Eastern Bluebird	1	X	6/17/2001	26 N	11 W	1
Eastern Bluebird	1	X	6/18/2002	26 N	11 W	1
Eastern Bluebird	2	X	6/11/2005	26 N	11 W	1
Eastern Kingbird	4	X	6/29/2004	26 N	11 W	1
Eastern Kingbird	2	X	6/11/2005	26 N	11 W	1
Eastern Meadowlark	2	X	6/17/2001	26 N	11 W	1
Eastern Meadowlark	5	S	6/29/2004	26 N	11 W	1
Eastern Meadowlark	6	S	6/11/2005	26 N	11 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Eastern Phoebe	2	X	6/17/2001	26 N	11 W	1
Eastern Phoebe	1	X	6/11/2005	26 N	11 W	1
Eastern Wood-Pewee	1	X	6/17/2001	26 N	11 W	1
European Starling	9	V	6/17/2001	26 N	11 W	1
European Starling	35	V	6/29/2004	26 N	11 W	1
European Starling	36	V	6/11/2005	26 N	11 W	1
Gray Catbird	4	X	6/17/2001	26 N	11 W	1
Gray Catbird	2	X	6/18/2002	26 N	11 W	1
Gray Catbird	1	X	6/11/2005	26 N	11 W	1
Great Blue Heron	1	V	6/29/2004	26 N	11 W	1
House Finch	5	S	6/17/2001	26 N	11 W	1
House Finch	1	X	6/29/2004	26 N	11 W	1
House Sparrow	1	X	6/18/2002	26 N	11 W	1
House Sparrow	1	X	6/29/2004	26 N	11 W	1
House Wren	2	X	6/17/2001	26 N	11 W	1
House Wren	1	X	6/18/2002	26 N	11 W	1
House Wren	1	X	6/29/2004	26 N	11 W	1
House Wren	3	X	6/11/2005	26 N	11 W	1
Indigo Bunting	3	X	6/29/2004	26 N	11 W	1
Indigo Bunting	1	X	6/11/2005	26 N	11 W	1
Killdeer	1	V	6/17/2001	26 N	11 W	1
Killdeer	4	V	6/29/2004	26 N	11 W	1
Killdeer	3	V	6/11/2005	26 N	11 W	1
Mourning Dove	7	S	6/17/2001	26 N	11 W	1
Mourning Dove	8	V	6/29/2004	26 N	11 W	1
Mourning Dove	4	V	6/11/2005	26 N	11 W	1
Mourning Warbler	1	X	6/17/2001	26 N	11 W	1
Mourning Warbler	1	X	6/18/2002	26 N	11 W	1
Mourning Warbler	1	X	6/11/2005	26 N	11 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Northern Flicker	1	V	6/17/2001	26 N	11 W	1
Northern Flicker	2	V	6/29/2004	26 N	11 W	1
Northern Flicker	1	V	6/11/2005	26 N	11 W	1
Northern Mockingbird	1	X	6/18/2002	26 N	11 W	1
Ovenbird	1	X	6/18/2002	26 N	11 W	1
Ovenbird	1	X	6/11/2005	26 N	11 W	1
Pileated Woodpecker	1	V	6/17/2001	26 N	11 W	1
Red-eyed Vireo	1	X	6/29/2004	26 N	11 W	1
Red-shouldered Hawk	1	NY	6/21/2004	26 N	11 W	1
Red-tailed Hawk	2	V	6/11/2005	26 N	11 W	1
Red-winged Blackbird	6	S	6/17/2001	26 N	11 W	1
Red-winged Blackbird	10	S	6/29/2004	26 N	11 W	1
Red-winged Blackbird	10	S	6/11/2005	26 N	11 W	1
Ring-billed Gull	1	O	6/11/2005	26 N	11 W	1
Rose-breasted Grosbeak	1	X	6/29/2004	26 N	11 W	1
Savannah Sparrow	1	X	6/17/2001	26 N	11 W	1
Song Sparrow	1	X	6/17/2001	26 N	11 W	1
Song Sparrow	1	X	6/29/2004	26 N	11 W	1
Song Sparrow	4	X	6/11/2005	26 N	11 W	1
Tree Swallow	8	V	6/17/2001	26 N	11 W	1
Tree Swallow	2	V	6/29/2004	26 N	11 W	1
Tree Swallow	4	V	6/11/2005	26 N	11 W	1
Tufted Titmouse	1	X	6/17/2001	26 N	11 W	1
Tufted Titmouse	1	X	6/29/2004	26 N	11 W	1
Vesper Sparrow	1	X	6/17/2001	26 N	11 W	1
Vesper Sparrow	2	X	6/29/2004	26 N	11 W	1
Warbling Vireo	1	X	6/17/2001	26 N	11 W	1
Warbling Vireo	1	X	6/11/2005	26 N	11 W	1
White-breasted Nuthatch	1	X	6/29/2004	26 N	11 W	1

Appendix B- Breeding Bird Atlas- Grand Traverse County, Kalamazoo Nature Center

Yellow Warbler	2	X	6/11/2005	26 N	11 W	1
Grasshopper Sparrow	1	X	7/4/2006	27 N	11 W	1
Merlin	1	FL	6/19/2006	27 N	11 W	1
Great Horned Owl	1	X	2/4/2004	27 N	11 W	4

APPENDIX C - North American Breeding Bird Survey, Grand Traverse County – United States Geological Survey

BBS survey routes 029 and 230, Grand Traverse County, 2005.

Data includes bird species and total number of birds counted during the 2005 BBS. 2006 data is not yet available.

BBS Route #49029, Skegemog Point, Michigan

Species	2005
Canada Goose	1
Wood Duck	2
American Black Duck	11
Mallard	0
Blue-winged Teal	0
Hooded Merganser	0
Ring-necked Pheasant	0
Ruffed Grouse	0
Wild Turkey	2
Common Loon	0
Great Blue Heron	0
Green Heron	0
Turkey Vulture	1
Northern Harrier	0
Cooper's Hawk	0
Red-shouldered Hawk	0
Broad-winged Hawk	1
Red-tailed Hawk	1
American Kestrel	1
Virginia Rail	0
Sora	0
Killdeer	3
Spotted Sandpiper	0
Upland Sandpiper	0
American Woodcock	0
Ring-billed Gull	50
Herring Gull	0
Rock Pigeon	0
Mourning Dove	9

**APPENDIX C - North American Breeding Bird Survey, Grand Traverse County –
United States Geological Survey**

Species	2005
Black-billed Cuckoo	0
Yellow-billed Cuckoo	1
Great Horned Owl	0
Barred Owl	0
Common Nighthawk	0
Whip-poor-will	0
Chimney Swift	0
Ruby-throated Hummingbird	0
Belted Kingfisher	1
Red-bellied Woodpecker	0
Yellow-bellied Sapsucker	1
Downy Woodpecker	1
Hairy Woodpecker	0
Yellow-shafted Flicker	2
Pileated Woodpecker	2
Eastern Wood-Pewee	4
Alder Flycatcher	0
Willow Flycatcher	0
Least Flycatcher	1
Eastern Phoebe	0
Great Crested Flycatcher	4
Eastern Kingbird	3
Yellow-throated Vireo	0
Blue-headed Vireo	4
Warbling Vireo	1
Red-eyed Vireo	22
Blue Jay	19
American Crow	30
Common Raven	23
Horned Lark	0
Purple Martin	0
Tree Swallow	6
Northern Rough-winged Swallow	0
Bank Swallow	38
Cliff Swallow	0
Barn Swallow	5

**APPENDIX C - North American Breeding Bird Survey, Grand Traverse County –
United States Geological Survey**

Species	2005
Tufted Titmouse	0
Red-breasted Nuthatch	3
White-breasted Nuthatch	1
Brown Creeper	2
House Wren	0
Winter Wren	2
Sedge Wren	0
Golden-crowned Kinglet	0
Blue-gray Gnatcatcher	0
Eastern Bluebird	5
Veery	0
Hermit Thrush	6
Wood Thrush	0
American Robin	38
Gray Catbird	1
Brown Thrasher	1
European Starling	46
Cedar Waxwing	15
Golden-winged Warbler	0
Nashville Warbler	1
Yellow Warbler	2
Chestnut-sided Warbler	0
Magnolia Warbler	0
Black-throated Blue Warbler	0
Myrtle Warbler	6
Black-throated Green Warbler	1
Blackburnian Warbler	0
Pine Warbler	12
Kirtland's Warbler	0
Black-and-white Warbler	1
American Redstart	0
Ovenbird	37
Northern Waterthrush	0
Connecticut Warbler	0
Mourning Warbler	2
Common Yellowthroat	4

**APPENDIX C - North American Breeding Bird Survey, Grand Traverse County –
United States Geological Survey**

Species	2005
Canada Warbler	0
Scarlet Tanager	6
Eastern Towhee	0
Chipping Sparrow	34
Field Sparrow	3
Vesper Sparrow	4
Savannah Sparrow	1
Grasshopper Sparrow	2
Song Sparrow	8
Swamp Sparrow	2
White-throated Sparrow	2
Northern Cardinal	1
Rose-breasted Grosbeak	5
Indigo Bunting	14
Bobolink	4
Red-winged Blackbird	44
Eastern Meadowlark	2
Western Meadowlark	0
Brewer's Blackbird	0
Common Grackle	14
Brown-headed Cowbird	12
Baltimore Oriole	6
Purple Finch	1
House Finch	4
Red Crossbill	0
American Goldfinch	22
Evening Grosbeak	0
House Sparrow	0
Number of Species	72



**APPENDIX C - North American Breeding Bird Survey, Grand Traverse County –
 United States Geological Survey
 BBS Route #49230, Mayfield, Michigan**

Species	2005
Canada Goose	0
Wood Duck	0
Mallard	15
Red-breasted Merganser	0
Ring-necked Pheasant	1
Wild Turkey	1
Common Loon	0
Great Blue Heron	0
Turkey Vulture	3
Red-shouldered Hawk	0
Broad-winged Hawk	0
Red-tailed Hawk	2
American Kestrel	5
Sandhill Crane	0
Killdeer	6
Upland Sandpiper	5
Ring-billed Gull	16
Herring Gull	0
Rock Pigeon	0
Mourning Dove	41
Black-billed Cuckoo	0
Yellow-billed Cuckoo	0
Whip-poor-will	1
Chimney Swift	0
Ruby-throated Hummingbird	0
Belted Kingfisher	0
Red-headed Woodpecker	0
Red-bellied Woodpecker	1
Yellow-bellied Sapsucker	0
Downy Woodpecker	2
Hairy Woodpecker	0
Yellow-shafted Flicker	2
Pileated Woodpecker	1
Eastern Wood-Pewee	2

**APPENDIX C - North American Breeding Bird Survey, Grand Traverse County –
United States Geological Survey**

Species	2005
Alder Flycatcher	4
Least Flycatcher	0
Eastern Phoebe	5
Great Crested Flycatcher	6
Eastern Kingbird	10
Blue-headed Vireo	2
Warbling Vireo	4
Red-eyed Vireo	14
Blue Jay	19
American Crow	36
Horned Lark	0
Purple Martin	0
Tree Swallow	19
Northern Rough-winged Swallow	3
Bank Swallow	5
Cliff Swallow	0
Barn Swallow	13
Black-capped Chickadee	21
Tufted Titmouse	5
Red-breasted Nuthatch	0
White-breasted Nuthatch	3
House Wren	6
Winter Wren	2
Eastern Bluebird	8
Veery	0
Hermit Thrush	2
Wood Thrush	0
American Robin	68
Gray Catbird	3
Northern Mockingbird	1
Brown Thrasher	2
European Starling	206
Cedar Waxwing	14
Tennessee Warbler	0
Nashville Warbler	2
Yellow Warbler	2

**APPENDIX C - North American Breeding Bird Survey, Grand Traverse County –
United States Geological Survey**

Species	2005
Chestnut-sided Warbler	1
Magnolia Warbler	0
Cape May Warbler	2
Myrtle Warbler	1
Black-throated Green Warbler	1
Pine Warbler	1
Black-and-white Warbler	1
American Redstart	1
Ovenbird	11
Mourning Warbler	4
Common Yellowthroat	6
Canada Warbler	1
Scarlet Tanager	3
Eastern Towhee	0
Chipping Sparrow	27
Field Sparrow	2
Vesper Sparrow	2
Savannah Sparrow	12
Grasshopper Sparrow	4
Song Sparrow	28
Swamp Sparrow	0
White-throated Sparrow	3
Northern Cardinal	12
Rose-breasted Grosbeak	16
Indigo Bunting	17
Dickcissel	0
Bobolink	18
Red-winged Blackbird	63
Eastern Meadowlark	18
Brewer's Blackbird	0
Common Grackle	39
Brown-headed Cowbird	1
Baltimore Oriole	8
House Finch	2
American Goldfinch	41
House Sparrow	1
Number of Species	75



Appendix D- Furbearer Survey- Grand Traverse Band of Ottawa and Chippewa Indians

Species	2005	2006
Red Fox	5	2
Gray Fox	0	3
Bobcat	48	29
Coyote	65	21
Raccoon	12	15
Opossum	3	0
Weasels	13	4
Skunk	6	0
Pine Marten	4	0
Mink	7	1
Otter	1	0

Ten stations in Grand Traverse and ten in Kalkaska county, half near Boardman River.

Example of Data Collected on Bobcats

Location	Year	Date	Bait Position	Treatment	Bobcat
Gt1	2005	2/11/2005	4	2	1
Gt1	2005	2/11/2005	1	2	2
Gt1	2005	2/11/2005	2	2	2
Gt1	2005	2/24/2005	2	2	2
Gt1	2005	2/24/2005	4	2	2
Gt1	2005	2/24/2005	5	2	2
Gt1	2005	3/4/2005	2	2	2
Gt1	2005	3/4/2005	4	2	2
Gt1	2005	3/4/2005	5	2	2
Gt1	2005	3/11/2005	5	2	1
Gt1	2005	3/11/2005	2	2	2
Gt1	2005	3/11/2005	4	2	2
Gt1	2006	2/18/2006	2	2	1
Gt1	2006	2/18/2006	4	2	1
Gt1	2006	2/18/2006	5	2	2
Gt1	2006	2/18/2006	2	1	2
Gt1	2006	2/18/2006	4	1	2
Gt1	2006	2/18/2006	5	1	2
Gt1	2006	2/27/2006	2	1	2
Gt1	2006	2/27/2006	4	1	2
Gt1	2006	2/27/2006	5	1	2
Gt1	2006	3/6/2006	2	1	2
Gt1	2006	3/6/2006	4	1	2
Gt1	2006	3/6/2006	5	1	2
Gt1	2006	3/14/2006	2	1	2
Gt1	2006	3/14/2006	4	1	2
Gt1	2006	3/14/2006	5	1	2
Gt1	2006	3/22/2006	2	1	2
Gt1	2006	3/22/2006	4	1	2

Appendix E- Boardman River Frog and Toad Survey 2007

Location	Habitat	22-Apr-07	21-May-07	13-Jun-07
Brown Bridge Delta 44.6432N 85.4895W	emergent marsh and shrub	Spring Peeper-3	Spring Peeper-2 AmericanToad-3	Green Frog-1 Gray Tree Frog-2
Arbutus Hill Road 44.6439N 85.5177W	emergent marsh and shrub	Spring Peeper-3 Striped Chorus Frog-1 Wood Frog-2	Spring Peeper-3 Gray Tree Frog-1 Green Frog-1	None
Brown Bridge Loon Marsh 44.6978N 85.6223W	emergent marsh	Spring Peeper-3 Leopard Frog-2	Spring Peeper-3 Green Frog-1	Green Frog-1
Roadside Pond 44.6478N 85.5550W	pond	Spring Peeper-2 Leopard Frog-1	Spring Peeper-2 Leopard Frog-1 Green Frog-2	Green Frog-2
River Highland Dr. Pond 44.6567N 85.5911W	sedge, cattail roadside ditch	Spring Peeper-3 Striped Chorus Frog-1	None	None
River Road & Sleights Pond 44.6579N 85.5927	sedge, cattail roadside ditch	Spring Peeper-3 Striped Chorus Frog-1 American Toad-2	None	None
Lone Pine Flats	emergent marsh river	AmericanToad-3	None	None
Upper Sabin Pond Marsh	emergent marsh pond	Spring Peeper-2 American Toad-3	Spring Peeper-1 Green Frog-3	Green Frog-3
YMCA Marsh Pond 44.7302N 85.6167W	pond and wooded border	Spring Peeper-2 American Toad-2	Green Frog-1 Gray Tree Frog-2	Green Frog-2
Logan's Landing Backwater 44.7356N 85.6144W	pond and wooded border	Spring Peeper-1 American Toad-3	None	None

1= Individuals can be counted-space between calls.

2= Calls of some individuals can be counted, but there is some overlapping of calls (6-12 individuals).

3=Full chorus. Calls are constant, continuous and overlapping, unable to count..

Appendix F - Boardman River Waterfowl Survey 2007

Species	Boardman Lake	Sabin Pond	Boardman Pond	Brown Bridge Pond	Total
Common Loon				7	7
Pied-billed Grebe	7	3			10
Double-crested Cormorant			1		1
Mute Swan	14	9	9		32
Trumpeter Swan				4	4
Canada Goose	36	109	12	21	178
Mallard	40	7	6	12	65
American Black Duck	2	2	2	6	12
Northern Shoveler	2				2
Green-winged Teal		2			2
Wood Duck			1	8	9
Redhead	838				838
Ring-necked Duck	7			15	22
Scaup sp.	100	1			101
Greater scaup	15				15
Lesser Scaup	28				28
Common Goldeneye	5		11	4	20
Bufflehead	267	69	25	237	598
Hooded Merganser	1	5	2	4	12
Common Merganser	36		1	8	45
Ring-billed Gull	110	8		10	128
Herring Gull	9				9
Caspian Tern	1				1
American Coot	1				1
Muscovy Duck	27				27
	1546	215	70	336	2167

**Appendix G. Breeding Bird Survey at 13 Sites in the Boardman Valley
2-June-07**

Common Name	Scientific Name														TOTAL	
		Brown Bridge Oaks	Brown Bridge Boardwalk	Brown Bridge Delta	Abuttus Hill Rd.	Brown Bridge Landing	McGillivraies Pond	Shumsky Landing	Shumsky Rightofway	Appel Cottage	Lone Pine	Sabin Bus Garage	Sabin Dam	Oleson Bridge		
common loon	<i>Gavia immer</i>		1				2						*	*	3	
pied-billed grebe	<i>Podilymbus podiceps</i>		1										*	*	1	
mute swan	<i>Cygnus olor</i>											1	*	*	1	
trumpeter swan	<i>Cygnus buccinator</i>												*	*	0	
Canada goose	<i>Branta canadensis</i>		2			2							*	*	4	
wood duck	<i>Aix sponsa</i>											1	*	*	1	
mallard	<i>Anas platyrhynchos</i>											3	*	*	3	
bufflehead	<i>Bucephala albeola</i>												*	*	0	
bald eagle	<i>Haliaeetus leucocephalus</i>												*	*	0	
Cooper's hawk	<i>Accipiter cooperii</i>								1				*	*	1	
wild turkey	<i>Meleagris gallapavo</i>												*	*	0	
killdeer	<i>Charadrius vociferus</i>												*	*	0	
spotted sandpiper	<i>Actitis macularia</i>			4							6		*	*	10	
ring-billed gull	<i>Larus delawarensis</i>												*	*	0	
mourning dove	<i>Zenaida macroura</i>									3			*	*	3	
black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>												*	*	0	
yellow-billed cuckoo	<i>Coccyzus americanus</i>								1				*	*	1	
ruby-throated hummingbird	<i>Archilochus colubris</i>												*	*	0	
belted kingfisher	<i>Ceryle alcyon</i>		1			1							*	*	2	
red-bellied woodpecker	<i>Melanerpes carolinus</i>												*	*	0	
downy woodpecker	<i>Picoides pubescens</i>												*	*	0	
hairy woodpecker	<i>Picoides villosus</i>						1			1			*	*	2	
northern flicker	<i>Colaptes auratus</i>												*	*	0	
pileated woodpecker	<i>Dryocopus pileatus</i>						1						*	*	1	
eastern wood-pewee	<i>Contopus virens</i>												*	*	0	
least flycatcher	<i>Empidonax minimus</i>								1				*	*	1	
eastern phoebe	<i>Sayornis phoebe</i>								1	1			*	*	2	
great-crested flycatcher	<i>Myiarchus crinitus</i>	2	2		1				2		4	2	*	*	13	
eastern kingbird	<i>Tyrannus tyrannus</i>												*	*	0	
warbling vireo	<i>Vireo gilvus</i>												*	*	0	
red-eyed vireo	<i>Vireo olivaceus</i>	4			3	6	1			3	2		*	*	19	
blue jay	<i>Cyanocitta cristata</i>	2								1		4	*	*	7	
American crow	<i>Corvus brachyrhynchos</i>					4							*	*	4	
common raven	<i>Corvus corax</i>												*	*	0	
tree swallow	<i>Tachycineta bicolor</i>			4		2	2				1		*	*	9	
northern rough-winged	<i>Stelgidopteryx serripennis</i>												*	*	0	
black-capped chickadee	<i>Poecile atricapillus</i>					1						1	*	*	2	
tufted titmouse	<i>Baeolophus bicolor</i>										1		*	*	2	
white-breasted nuthatch	<i>Sitta carolinensis</i>									1			*	*	1	
house wren	<i>Troglodytes aedon</i>												*	*	0	
eastern bluebird	<i>Sialia sialis</i>												*	*	0	
veery	<i>Catharus fuscescens</i>												*	*	0	
hermit thrush	<i>Catharus guttatus</i>												*	*	0	
wood thrush	<i>Hylocichla mustelina</i>												*	*	0	
American robin	<i>Turdus migratorius</i>	2									2		*	*	4	
gray catbird	<i>Dumetella carolinensis</i>												*	*	0	
brown thrasher	<i>Toxostoma rufum</i>										2		*	*	2	
European starling	<i>Sturnus vulgaris</i>											2	*	*	2	
cedar waxwing	<i>Bombycilla cedrorum</i>												*	*	0	
blue-winged warbler	<i>Vermivora pinus</i>												*	*	0	
golden-winged warbler	<i>Vermivora chrysoptera</i>												*	*	0	
yellow warbler	<i>Dendroica petechia</i>						2	2					*	*	4	
chestnut-sided warbler	<i>Dendroica pensylvanica</i>				2			2		2			*	*	6	
yellow-rumped warbler	<i>Dendroica coronata</i>												*	*	0	
pine warbler	<i>Dendroica pinus</i>					2							*	*	2	
black-and-white warbler	<i>Mniotilta varia</i>					1							*	*	1	
American redstart	<i>Setophaga ruticilla</i>	6									1		*	*	7	
ovenbird	<i>Seiurus aurocapillus</i>				1	3							*	*	4	
common yellowthroat	<i>Geothlypis trichas</i>			2			3	4		2			*	*	11	
scarlet tanager	<i>Piranga olivacea</i>												*	*	0	
northern cardinal	<i>Cardinalis cardinalis</i>												*	*	0	
rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>											1	*	*	1	
indigo bunting	<i>Passerina cyanea</i>										2		*	*	2	
chipping sparrow	<i>Spizella passerina</i>	1											*	*	1	
song sparrow	<i>Melospiza melodia</i>			1		1					1		*	*	3	
white-throated sparrow	<i>Zonotrichia albicollis</i>										3		*	*	3	
red-winged blackbird	<i>Agelaius phoeniceus</i>							20			12		*	*	32	
eastern meadowlark	<i>Sturnella magna</i>												*	*	0	
Brewer's blackbird	<i>Euphagus cyanocephalus</i>												*	*	0	
common grackle	<i>Quiscalus quiscula</i>										3	1	*	*	4	
brown-headed cowbird	<i>Molothrus ater</i>											1	*	*	1	
Baltimore oriole	<i>Icterus galbula</i>							2				3	2	*	*	7
American goldfinch	<i>Carduelis tristis</i>									2	10	5	2	*	*	19
	Totals	17	7	11	7	27	30	11	7	34	37	21	*	*	209	

*No observations

**Appendix G. Breeding Bird Survey at 13 Sites in the Boardman Valley
9-June-07**

Common Name	Scientific Name														TOTAL
		Brown Bridge Oaks	Brown Bridge Boardwalk	Brown Bridge Delta	Arbutus Hill Rd.	Brown Bridge Landing	McGillivraies Pond	Shumsky Landing	Shumsky Rightofway	Appel Cottage	Lone Pine	Sabin Bus Garage	Sabin Dam	Oleson Bridge	
common loon	<i>Gavia immer</i>			2										*	2
pied-billed grebe	<i>podilymbus podiceps</i>					1								*	1
mute swan	<i>Cygnus olor</i>													*	0
trumpeter swan	<i>Cygnus buccinator</i>			2		2								*	4
Canada goose	<i>Branta canadensis</i>			5										*	5
wood duck	<i>Aix sponsa</i>													*	0
mallard	<i>Anas platyrhynchos</i>		4	1							1			*	6
bufflehead	<i>Bucephala albeola</i>													*	0
bald eagle	<i>Haliaeetus leucocephalus</i>	1												*	1
Cooper's hawk	<i>Accipiter cooperii</i>													*	0
wild turkey	<i>Meleagris gallapavo</i>													*	0
killdeer	<i>Charadrius vociferus</i>										1			*	1
spotted sandpiper	<i>Actitis macularia</i>			1							4			*	5
ring-billed gull	<i>Larus delawarensis</i>					1							1	*	2
mourning dove	<i>Zenaida macroura</i>											1	3	*	4
black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>													*	0
yellow-billed cuckoo	<i>Coccyzus americanus</i>					1				1				*	2
ruby-throated hummingbird	<i>Archilochus colubris</i>									1				*	1
belted kingfisher	<i>Ceryle alcyon</i>												1	*	1
red-bellied woodpecker	<i>Melanerpes carolinus</i>													*	0
downy woodpecker	<i>Picoides pubescens</i>													*	0
hairy woodpecker	<i>Picoides villosus</i>				1									*	1
northern flicker	<i>Colaptes auratus</i>							1	1					*	2
pileated woodpecker	<i>Dryocopus pileatus</i>		1							1				*	2
eastern wood-pewee	<i>Contopus virens</i>	2				1								*	3
least flycatcher	<i>Empidonax minimus</i>													*	0
eastern phoebe	<i>Sayornis phoebe</i>								1				1	*	2
great-crested flycatcher	<i>Myiarchus crinitus</i>		1						1					*	2
eastern kingbird	<i>Tyrannus tyrannus</i>													*	0
warbling vireo	<i>Vireo gilvus</i>													*	0
red-eyed vireo	<i>Vireo olivaceus</i>	3		7	1					4	2			*	17
blue jay	<i>Cyanocitta cristata</i>		1										1	*	2
American crow	<i>Corvus brachyrhynchos</i>	1			1				1	1	1			*	5
common raven	<i>Corvus corax</i>													*	0
tree swallow	<i>Tachycineta bicolor</i>					1								*	1
northern rough-winged	<i>Stelgidopteryx serripennis</i>													*	0
black-capped chickadee	<i>Poecile atricapillus</i>					1						1	2	*	4
tufted titmouse	<i>Baeolophus bicolor</i>								1	2				*	3
white-breasted nuthatch	<i>Sitta carolinensis</i>													*	0
house wren	<i>Troglodytes aedon</i>													*	0
eastern bluebird	<i>Sialia sialis</i>													*	0
veery	<i>Catharus fuscescens</i>	1												*	1
hermit thrush	<i>Catharus guttatus</i>													*	0
wood thrush	<i>Hylocichla mustelina</i>	1								1				*	2
American robin	<i>Turdus migratorius</i>				1				1				1	*	3
gray catbird	<i>Dumetella carolinensis</i>													*	0
brown thrasher	<i>Toxostoma rufum</i>													*	0
European starling	<i>Sturnus vulgaris</i>									2	1	10	1	*	14
cedar waxwing	<i>Bombycilla cedrorum</i>				6					4				*	10
blue-winged warbler	<i>Vermivora pinus</i>													*	0
golden-winged warbler	<i>Vermivora chrysoptera</i>													*	0
yellow warbler	<i>Dendroica petechia</i>									1				*	1
chestnut-sided warbler	<i>Dendroica pensylvanica</i>					1					3			*	4
yellow-rumped warbler	<i>Dendroica coronata</i>	1												*	1
pine warbler	<i>Dendroica pinus</i>	2				1								*	3
black-and-white warbler	<i>Mniotilta varia</i>													*	0
American redstart	<i>Setophaga ruticilla</i>								2				1	*	3
ovenbird	<i>Seiurus aurocapillus</i>	1				2					1			*	4
common yellowthroat	<i>Geothlypis trichas</i>		1					2	1	1	2	1		*	8
scarlet tanager	<i>Piranga olivacea</i>	1												*	1
northern cardinal	<i>Cardinalis cardinalis</i>									1			1	*	3
rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>													*	0
indigo bunting	<i>Passerina cyanea</i>				1					1	1		3	*	7
chipping sparrow	<i>Spizella passerina</i>													*	0
song sparrow	<i>Melospiza melodia</i>		5			1		1		6	2			*	15
white-throated sparrow	<i>Zonotrichia albicollis</i>									5				*	5
red-winged blackbird	<i>Agelaius phoeniceus</i>			5		1	8					8		*	22
eastern meadowlark	<i>Sturnella magna</i>													*	0
Brewer's blackbird	<i>Euphagus cyanocephalus</i>												1	*	1
common grackle	<i>Quiscalus quiscula</i>										1		1	*	2
brown-headed cowbird	<i>Molothrus ater</i>													*	0
Baltimore oriole	<i>Icterus galbula</i>	1						2	1	1	2	1	1	*	9
American goldfinch	<i>Carduelis tristis</i>									1		1	4	*	10
														*	
	Totals	15	13	16	17	15	14	9	7	34	26	22	20	*	208

*No observations

**Appendix G. Breeding Bird Survey at 13 Sites in the Boardman Valley
11-June-07**

Common Name	Scientific Name														TOTAL
		Brown Bridge Oaks	Brown Bridge Boardwalk	Brown Bridge Delta	Arbutus Hill Rd.	Brown Bridge Landing	McGillivraies Pond	Shumsky Landing	Shumsky Rightofway	Appel Cottage	Lone Pine	Sabin Bus Garage	Sabin Dam	Oleson Bridge	
common loon	<i>Gavia immer</i>													*	0
pied-billed grebe	<i>podilymbus podiceps</i>													*	0
mute swan	<i>Cygnus olor</i>													*	0
trumpeter swan	<i>Cygnus buccinator</i>						2							*	2
Canada goose	<i>Branta canadensis</i>													*	0
wood duck	<i>Aix sponsa</i>			1										*	1
mallard	<i>Anas platyrhynchos</i>			12								6		*	18
bufflehead	<i>Bucephala albeola</i>													*	0
bald eagle	<i>Haliaeetus leucocephalus</i>													*	0
Cooper's hawk	<i>Accipiter cooperii</i>													*	0
wild turkey	<i>Meleagris gallapavo</i>													*	0
killdeer	<i>Charadrius vociferus</i>										1			*	1
spotted sandpiper	<i>Actitis macularia</i>			1							6			*	7
ring-billed gull	<i>Larus delawarensis</i>												1	*	1
mourning dove	<i>Zenaida macroura</i>											4	2	*	6
black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>													*	0
yellow-billed cuckoo	<i>Coccyzus americanus</i>													*	0
ruby-throated hummingbird	<i>Archilochus colubris</i>													*	0
belted kingfisher	<i>Ceryle alcyon</i>			1										*	1
red-bellied woodpecker	<i>Melanerpes carolinus</i>													*	0
downy woodpecker	<i>Picoides pubescens</i>													*	0
hairy woodpecker	<i>Picoides villosus</i>													*	0
northern flicker	<i>Colaptes auratus</i>													*	0
pileated woodpecker	<i>Dryocopus pileatus</i>					1	1							*	2
eastern wood-pewee	<i>Contopus virens</i>	5	1		1									*	7
least flycatcher	<i>Empidonax minimus</i>													*	0
eastern phoebe	<i>Sayornis phoebe</i>													*	0
great-crested flycatcher	<i>Myiarchus crinitus</i>	1			1	1				1		2		*	6
eastern kingbird	<i>Tyrannus tyrannus</i>													*	0
warbling vireo	<i>Vireo gilvus</i>													*	0
red-eyed vireo	<i>Vireo olivaceus</i>	4	1		4					1				*	10
blue jay	<i>Cyanocitta cristata</i>	2	1								1	1	5	*	10
American crow	<i>Corus brachyrhynchos</i>	1	1	3		1	1		1					*	8
common raven	<i>Corus corax</i>													*	0
tree swallow	<i>Tachycineta bicolor</i>			6						1			4	*	11
northern rough-winged	<i>Stelgidopteryx serripennis</i>													*	0
black-capped chickadee	<i>Poecile atricapillus</i>		6			6		8				4	3	*	27
tufted titmouse	<i>Baeolophus bicolor</i>									1				*	1
white-breasted nuthatch	<i>Sitta carolinensis</i>													*	0
house wren	<i>Troglodytes aedon</i>													*	0
eastern bluebird	<i>Sialia sialis</i>													*	0
veery	<i>Catharus fuscescens</i>													*	0
hermit thrush	<i>Catharus guttatus</i>													*	0
wood thrush	<i>Hylocichla mustelina</i>	1												*	1
American robin	<i>Turdus migratorius</i>	1				1					1			*	3
gray catbird	<i>Dumetella carolinensis</i>									1				*	1
brown thrasher	<i>Toxostoma rufum</i>													*	0
European starling	<i>Sturnus vulgaris</i>											12	8	*	20
cedar waxwing	<i>Bombycilla cedrorum</i>													*	0
blue-winged warbler	<i>Vermivora pinus</i>													*	0
golden-winged warbler	<i>Vermivora chrysoptera</i>													*	0
yellow warbler	<i>Dendroica petechia</i>													*	0
chestnut-sided warbler	<i>Dendroica pensylvanica</i>					1			1	4				*	6
yellow-rumped warbler	<i>Dendroica coronata</i>		1			1								*	2
pine warbler	<i>Dendroica pinus</i>													*	0
black-and-white warbler	<i>Mniotilta varia</i>													*	0
American redstart	<i>Setophaga ruticilla</i>					1				1				*	2
ovenbird	<i>Seiurus aurocapillus</i>	1				1								*	2
common yellowthroat	<i>Geothlypis trichas</i>							4	4	1	1			*	10
scarlet tanager	<i>Piranga olivacea</i>		1											*	1
northern cardinal	<i>Cardinalis cardinalis</i>													*	0
rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>													*	0
indigo bunting	<i>Passerina cyanea</i>				1					1	1		1	*	4
chipping sparrow	<i>Spizella passerina</i>	1				1								*	2
song sparrow	<i>Melospiza melodia</i>			1					1	2		2	1	*	7
white-throated sparrow	<i>Zonotrichia albicollis</i>									2				*	2
red-winged blackbird	<i>Agelaius phoeniceus</i>			11		1	14	1			8	2		*	37
eastern meadowlark	<i>Sturnella magna</i>									1				*	1
Brewer's blackbird	<i>Euphagus cyanocephalus</i>													*	0
common grackle	<i>Quiscalus quiscula</i>						4	4					1	*	9
brown-headed cowbird	<i>Molothrus ater</i>													*	0
Baltimore oriole	<i>Icterus galbula</i>										1		1	*	2
American goldfinch	<i>Carduelis tristis</i>				1	4			1	1			1	*	8
														*	
	Totals	17	12	36	11	24	22	16	7	14	19	34	27	*	239

*No observations

**Appendix G. Breeding Bird Survey at 13 Sites in the Boardman Valley
20-June-07**

Common Name	Scientific Name														TOTAL				
		Brown Bridge Oaks	Brown Bridge Boardwalk	Brown Bridge Delta	Arbutus Hill Rd.	Brown Bridge Landing	McGillivraies Pond	Shumsky Landing	Shumsky Rightofway	Appel Cottage	Lone Pine	Sabin Bus Garage	Sabin Dam	Oleson Bridge					
common loon	<i>Gavia immer</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
pie-billed grebe	<i>podilymbus podiceps</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
mute swan	<i>Cygnus olor</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
trumpeter swan	<i>Cygnus buccinator</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Canada goose	<i>Branta canadensis</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
wood duck	<i>Aix sponsa</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
mallard	<i>Anas platyrhynchos</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
bufflehead	<i>Bucephala albeola</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
bald eagle	<i>Haliaeetus leucocephalus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Cooper's hawk	<i>Accipiter cooperii</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
wild turkey	<i>Meleagris gallapavo</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
killdeer	<i>Charadrius vociferus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
spotted sandpiper	<i>Actitis macularia</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
ring-billed gull	<i>Larus delawarensis</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
mourning dove	<i>Zenaida macroura</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
yellow-billed cuckoo	<i>Coccyzus americanus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
ruby-throated hummingbird	<i>Archilochus colubris</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
belted kingfisher	<i>Ceryle alcyon</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
red-bellied woodpecker	<i>Melanerpes carolinus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
downy woodpecker	<i>Picoides pubescens</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
hairy woodpecker	<i>Picoides villosus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
northern flicker	<i>Colaptes auratus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
pileated woodpecker	<i>Dryocopus pileatus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
eastern wood-pewee	<i>Contopus virens</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
least flycatcher	<i>Empidonax minimus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1
eastern phoebe	<i>Sayornis phoebe</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
great-crested flycatcher	<i>Myiarchus crinitus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
eastern kingbird	<i>Tyrannus tyrannus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
warbling vireo	<i>Vireo gilvus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
red-eyed vireo	<i>Vireo olivaceus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
blue jay	<i>Cyanocitta cristata</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5	5
American crow	<i>Corvus brachyrhynchos</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1
common raven	<i>Corvus corax</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
tree swallow	<i>Tachycineta bicolor</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
northern rough-winged	<i>Stelgidopteryx serripennis</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
black-capped chickadee	<i>Poecile atricapillus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1
tufted titmouse	<i>Baeolophus bicolor</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
white-breasted nuthatch	<i>Sitta carolinensis</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
house wren	<i>Troglodytes aedon</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
eastern bluebird	<i>Sialia sialis</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
veery	<i>Catharus fuscescens</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
hermit thrush	<i>Catharus guttatus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
wood thrush	<i>Hylocichla mustelina</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
American robin	<i>Turdus migratorius</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	7	7
gray catbird	<i>Dumetella carolinensis</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
brown thrasher	<i>Toxostoma rufum</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1
European starling	<i>Sturnus vulgaris</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
cedar waxwing	<i>Bombycilla cedrorum</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
blue-winged warbler	<i>Vermivora pinus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
golden-winged warbler	<i>Vermivora chrysoptera</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
yellow warbler	<i>Dendroica petechia</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
chestnut-sided warbler	<i>Dendroica pensylvanica</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
yellow-rumped warbler	<i>Dendroica coronata</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
pine warbler	<i>Dendroica pinus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
black-and-white warbler	<i>Mniotilta varia</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
American redstart	<i>Setophaga ruticilla</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1
ovenbird	<i>Seiurus aurocapillus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
common yellowthroat	<i>Geothlypis trichas</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
scarlet tanager	<i>Piranga olivacea</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
northern cardinal	<i>Cardinalis cardinalis</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	2
indigo bunting	<i>Passerina cyanea</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
chipping sparrow	<i>Spizella passerina</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
song sparrow	<i>Melospiza melodia</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1
white-throated sparrow	<i>Zonotrichia albicollis</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
red-winged blackbird	<i>Agelaius phoeniceus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	14	14
eastern meadowlark	<i>Sturnella magna</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	3	3
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
common grackle	<i>Quiscalus quiscula</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
brown-headed cowbird	<i>Molothrus ater</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Baltimore oriole	<i>Icterus galbula</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	2
American goldfinch	<i>Carduelis tristis</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	6	6
		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	45	45
	Totals	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	45	45

*No observations

Appendix H- Boardman River Bird Species, and Surveys

BBS- Breeding Bird Survey; BND-Banding records; WFS- Waterfowl Survey

Common Name	Scientific Name	BBS	BND	WFS	other	total
common loon	<i>Gavia immer</i>	8		7		15
pieb-billed grebe	<i>podilymbus podiceps</i>	3		10		13
double-crested cormorant	<i>Phalacrocorax auritus</i>			1		1
turkey vulture	<i>Cathartes aura</i>	4		11		15
mute swan	<i>Cygnus olor</i>	5		32		37
trumpeter swan	<i>Cygnus buccinator</i>	10		4		14
Canada goose	<i>Branta canadensis</i>	34		178		212
wood duck	<i>Aix sponsa</i>	3		9		12
green-winged teal	<i>Anas crecca</i>			2		2
American black duck	<i>Anas rubripes</i>			12		12
mallard	<i>Anas platyrhynchos</i>	55		65		120
redhead	<i>Aythya americana</i>			838		838
ring-necked duck	<i>Aythya collaris</i>			22		22
Scaup sp.	<i>Aythya sp.</i>			101		101
greater scaup	<i>Aythya marila</i>			15		15
lesser scaup	<i>Aythya affinis</i>			28		28
common goldeneye	<i>Bucephala clangula</i>			20		20
bufflehead	<i>Bucephala albeola</i>	1		598		599
hooded merganser	<i>Lophodytes cucullatus</i>			12		12
common merganser	<i>Mergus merganser</i>			45		45
bald eagle	<i>Haliaeetus leucocephalus</i>	1				1
sharp-shinned hawk	<i>Accipiter striatus</i>		3			3
Cooper's hawk	<i>Accipiter cooperii</i>	1				1
red-shouldered hawk	<i>Buteo lineatus</i>				1	1
broad-winged hawk	<i>Buteo swainsoni</i>		3		1	4
red-tailed hawk	<i>Buteo jamaicensis</i>		2			2
American kestrel	<i>Falco sparverius</i>		1			1
peregrine falcon	<i>Falco peregrinus</i>				1	1
ring-necked pheasant	<i>Phasianus colchicus</i>	1				1
ruffed grouse	<i>Bonasa umbellus</i>				1	1
wild turkey	<i>Meleagris gallapavo</i>	1				1
great blue heron	<i>Ardea herodias</i>	1				1

Appendix H- Boardman River Bird Species, and Surveys

BBS- Breeding Bird Survey; BND-Banding records; WFS- Waterfowl Survey

green heron	<i>Butorides striatus</i>			1	1
sora rail	<i>Porzana carolina</i>	1			1
America coot	<i>Fulica americana</i>			1	1
sandhill crane	<i>Grus canadensis</i>			1	1
killdeer	<i>Charadrius vociferus</i>	9			9
spotted sandpiper	<i>Actitis macularia</i>	29			29
American woodcock	<i>Scolopax minor</i>		63		63
ring-billed gull	<i>Larus delawarensis</i>	7		128	135
herring gull	<i>Larus argentatus</i>			9	9
Caspian tern	<i>Sterna caspia</i>			1	1
mourning dove	<i>Zenaida macroura</i>	21			21
black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	1	17		18
yellow-billed cuckoo	<i>Coccyzus americanus</i>	4	2	1	7
great horned	<i>Bubo virginianus</i>		5		5
northern saw-whet	<i>Aegolius acadicus</i>		1		1
common nighthawk	<i>Chordeiles minor</i>	1			1
ruby-throated hummingbird	<i>Archilochus colubris</i>	1			1
belted kingfisher	<i>Ceryle alcyon</i>	5		1	6
red-bellied woodpecker	<i>Melanerpes carolinus</i>	1			1
yellow-bellied sapsucker	<i>Sphyrapicus varius</i>			1	1
downy woodpecker	<i>Picoides pubescens</i>	1	16		17
hairy woodpecker	<i>Picoides villosus</i>	4	7		11
black-backed woodpecker	<i>Picoides arcticus</i>			1	1
northern flicker	<i>Colaptes auratus</i>	3	1	1	5
pileated woodpecker	<i>Dryocopus pileatus</i>	9			9
olive-sided flycatcher	<i>Contopus cooperi</i>		2		2
eastern wood-pewee	<i>Contopus virens</i>	13	5		18
yellow-bellied flycatcher	<i>Empidonax flaviventris</i>		9		9
alder flycatcher	<i>Empidonax alnorum</i>		24		24
Empidonax sp.	<i>Empidonax sp.</i>		27		27
least flycatcher	<i>Empidonax minimus</i>	3	17		20
eastern phoebe	<i>Sayornis phoebe</i>	9	4		13
great-crested flycatcher	<i>Myiarchus crinitus</i>	25	4		29
eastern kingbird	<i>Tyrannus tyrannus</i>	4	6		10
blue-headed vireo	<i>Vireo solitarius</i>		2		2
warbling vireo	<i>Vireo gilvus</i>	1	10		11
Philadelphia vireo	<i>Vireo philadelphicus</i>		10		10

Appendix H- Boardman River Bird Species, and Surveys

BBS- Breeding Bird Survey; BND-Banding records; WFS- Waterfowl Survey

red-eyed vireo	<i>Vireo olivaceus</i>	85	51		136
blue jay	<i>Cyanocitta cristata</i>	35	43		78
American crow	<i>Corus brachyrhynchos</i>	32			32
common raven	<i>Corus corax</i>	3			3
tree swallow	<i>Tachycineta bicolor</i>	60	90		150
northern rough-winged	<i>Stelgidopteryx serripennis</i>	1	1		2
barn swallow	<i>Hirundo rustica</i>	1	1		2
black-capped chickadee	<i>Poecile atricapillus</i>	74	203		277
tufted titmouse	<i>Baeolophus bicolor</i>	13			13
red-breasted nuthatch	<i>Sitta canadensis</i>		3	3	6
white-breasted nuthatch	<i>Sitta carolinensis</i>	3	21		24
brown creeper	<i>Certhia americana</i>		4		4
Carolina wren	<i>Thryothorus ludovicianus</i>			1	1
winter wren	<i>Troglodytes troglodytes</i>			1	1
house wren	<i>Troglodytes aedon</i>	1	8		9
golden-crowned kinglet	<i>Regulus satrapa</i>		7		7
ruby-crowned kinglet	<i>Regulus calendula</i>		9		9
eastern bluebird	<i>Sialia sialis</i>	2	10		12
veery	<i>Catharus fuscescens</i>	1	32		33
gray-checked thrush	<i>Catharus minimus</i>		11		11
Swainson's thrush	<i>Catharus ustulatus</i>		78		78
hermit thrush	<i>Catharus guttatus</i>	1	4		5
wood thrush	<i>Hylocichla mustelina</i>	8	5		13
American robin	<i>Turdus migratorius</i>	35	87		122
gray catbird	<i>Dumetella</i>	4	66		70
brown thrasher	<i>Toxostoma rufum</i>	5	30		35
European starling	<i>Sturnus vulgaris</i>	76	3		79
cedar waxwing	<i>Bombycilla cedrorum</i>	15	76		91
blue-winged warbler	<i>Vermivora pinus</i>			1	1
golden-winged warbler	<i>Vermivora chrysoptera</i>	3	14		17
Tennessee warbler	<i>Vermivora peregrina</i>		57		57
Nashville warbler	<i>Vermivora ruficapilla</i>		73		73
yellow warbler	<i>Dendroica petechia</i>	11	53		64
chestnut-sided warbler	<i>Dendroica pensylvanica</i>	22	21		43
magnolia warbler	<i>Dendroica magnolia</i>		25		25
Cape May warbler	<i>Dendroica tigrina</i>		1		1
black-throated blue warbler	<i>Dendroica caerulescens</i>		4		4

Appendix H- Boardman River Bird Species, and Surveys

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yellow-rumped warbler	<i>Dendroica coronata</i>	4	13		17
black-throated green warbler	<i>Dendroica virens</i>		3	2	5
pine warbler	<i>Dendroica pinus</i>	17			17
Kirtland's warbler	<i>Dendroica kirtlandii</i>			1	1
Palm warbler	<i>Dendroica palmarum</i>		4		4
bay-breasted warbler	<i>Dendroica castanea</i>		3		3
blackpoll warbler	<i>Dendroica striata</i>		6		6
black-and-white warbler	<i>Mniotilta varia</i>	2	23		25
American redstart	<i>Setophaga ruticilla</i>	29	63		92
ovenbird	<i>Seiurus aurocapillus</i>	25	51		76
northern waterthrush	<i>Seiurus noveboracensis</i>		3		3
Connecticut warbler	<i>Opornis agilis</i>		1		1
mourning warbler	<i>Oporornis philadelphia</i>		13		13
common yellowthroat	<i>Geothlypis trichas</i>	62	60		122
Wilson's warbler	<i>Wilsonia pusilla</i>		29		29
Canada warbler	<i>Wilsonia canadensis</i>		12		12
scarlet tanager	<i>Piranga olivacea</i>	2	2		4
northern cardinal	<i>Cardinalis cardinalis</i>	8	14		22
rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	5	148		153
indigo bunting	<i>Passerina cyanea</i>	20	20		40
eastern towhee	<i>Pipilo erythrophthalmus</i>			1	1
American tree	<i>Spizella arborea</i>		153		153
chipping sparrow	<i>Spizella passerina</i>	7	10		17
vesper sparrow	<i>Pooecetes gramineus</i>		1		1
song sparrow	<i>Melospiza melodia</i>	38	65		103
Lincoln's sparrow	<i>Melospiza lincolnii</i>		7		7
swamp sparrow	<i>Melospiza georgiana</i>		5	1	6
white-crowned sparrow	<i>Zonotrichia leucophrys</i>		6		6
white-throated sparrow	<i>Zonotrichia albicollis</i>	17	45		62
dark-eyed junco	<i>Junco hyemalis</i>		33		33
bobolink	<i>Dolichonyx oryzivorus</i>			1	1
red-winged blackbird	<i>Agelaius phoeniceus</i>	183	9		192
eastern meadowlark	<i>Sturnella magna</i>	4			4
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	20			20
common grackle	<i>Quiscalus quiscula</i>	25	1		26
brown-headed cowbird	<i>Molothrus ater</i>	1			1
Baltimore oriole	<i>Icterus galbula</i>	35	6		41

Appendix H- Boardman River Bird Species, and Surveys

BBS- Breeding Bird Survey; BND-Banding records; WFS- Waterfowl Survey

purple finch	<i>Carpodacus purpureus</i>		125		125
house finch	<i>Carpodacus mexicanus</i>			1	1
pine siskin	<i>Carduelis pinus</i>		101		101
American goldfinch	<i>Carduelis tristis</i>	74	163		237
evening grosbeak	<i>Coccothraustes vespertinus</i>		177		177
house sparrow	<i>Passer domesticus</i>		3		3
			<hr/>		
			1349	2710	2157

Appendix I Boardman River Small Mammal Survey 2007

SPECIES	DATE	LOCATION	LATITUDE	LONGITUDE	SEX	REPRO- CONDITION	AGE	WEIGHT	#TRAPS	HABITAT
Tamias striatus	7/16/2007	Brown Bridge Pond Dam	44.6433	85.5068	m	abd	A	100	160	UMCH
Peromyscus leucopus	7/16/2007	Brown Bridge Pond Dam	44.6433	85.5068	f	NENL	A	20	160	UMCH
Peromyscus leucopus	7/16/2007	Brown Bridge Pond Dam	44.6433	85.5068	f	NTNL	J	8	160	UMCH
Peromyscus leucopus	7/16/2007	Brown Bridge Pond Dam	44.6433	85.5068	f	NTNL	J	8	160	UMCH
Peromyscus leucopus	7/16/2007	Brown Bridge Pond Dam	44.6433	85.5068	f	preg, NTNL	SA	18	160	UMCH
Peromyscus leucopus	7/16/2007	Brown Bridge Pond Dam	44.6433	85.5068	f	NENL	A	26	160	UMCH
Peromyscus leucopus	7/16/2007	Brown Bridge Pond Dam	44.6433	85.5068	m	abd	J	9	160	UMCH
Peromyscus leucopus	7/16/2007	Brown Bridge Pond Dam	44.6433	85.5068	m	abd	SA	15	160	UMCH
Peromyscus leucopus?	7/16/2007	Brown Bridge Pond Dam	44.6433	85.5068	f	NENL	A	22	160	UMCH
Peromyscus leucopus	7/16/2007	S side of Brown Bridge Pond	44.6462	85.4855	m	scr	SA	18	120	LCF
Peromyscus leucopus	7/16/2007	S side of Brown Bridge Pond	44.6462	85.4855	f	NENL	A	20	120	LCF
Peromyscus leucopus	7/16/2007	S side of Brown Bridge Pond	44.6462	85.4855	m	abd	SA	15	120	LCF
Peromyscus leucopus	7/16/2007	S side of Brown Bridge Pond	44.6462	85.4855	f	NTNL	SA	16	120	LCF
Microtus pennsylvanicus	7/17/2007	N side of Brown Bridge Pond	44.6486	85.4886	f	NTNL	A	28	210	SW
Microtus pennsylvanicus	7/17/2007	N side of Brown Bridge Pond	44.6486	85.4886	f	NTNL	A	30	210	SW
Microtus pennsylvanicus	7/17/2007	N side of Brown Bridge Pond	44.6486	85.4886	f	NTNL	A	42	210	SW
Microtus pennsylvanicus	7/17/2007	N side of Brown Bridge Pond	44.6486	85.4886	f	NTNL	A	30	210	SW
Microtus pennsylvanicus	7/17/2007	N side of Brown Bridge Pond	44.6486	85.4886	m	abd	A	40	210	SW
Zapus hudsonius	7/17/2007	N side of Brown Bridge Pond	44.6486	85.4886	f	NENL	A	22	210	SW
Zapus hudsonius	7/17/2007	N side of Brown Bridge Pond	44.6486	85.4886	m	abd	SA/J	10	210	SW
Zapus hudsonius	7/17/2007	N side of Brown Bridge Pond	44.6486	85.4886	f	NTNL	SA/J	14	210	SW

Appendix I Boardman River Small Mammal Survey 2007

SPECIES	DATE	LOCATION	LATITUDE	LONGITUDE	SEX	REPRO- CONDITION	AGE	WEIGHT	#TRAPS	HABITAT
Blarina brevicauda	7/24/2007	Boardman Pond Delta	44.6855	85.6273	m	abd	A	*	60	SW&HW
Blarina brevicauda	7/24/2007	Boardman Pond Delta	44.6855	85.6273	m	abd	A	*	60	SW&HW
Microtus pennsylvanicus	7/24/2007	Boardman Pond Delta	44.6855	85.6273	m	scr	A	*	60	SW&HW
Microtus pennsylvanicus	7/24/2007	Boardman Pond Delta	44.6855	85.6273	*	*	*	*	60	SW&HW
Microtus pennsylvanicus	7/24/2007	Boardman Pond Delta	44.6855	85.6273	*	*	*	*	60	SW&HW
Microtus pennsylvanicus	7/24/2007	Boardman Pond Delta	44.6855	85.6273	*	*	*	*	60	SW&HW
Microtus pennsylvanicus	7/24/2007	Boardman Pond Delta	44.6855	85.6273	f	lac mamm	A	*	60	SW&HW
Zapus hudsonius	7/24/2007	Boardman Pond Delta	44.6855	85.6273	m	scr	A	*	60	LDF
Peromyscus leucopus	7/24/2007	Boardman Pond Delta	44.6855	85.6273	f	lac mamm	A	*	60	LDF
Blarina brevicauda	7/25/2007	Sabin Pond Delta	44.7002	85.6209	*	*	A	*	60	STH
Microtus pennsylvanicus	7/25/2007	Sabin Pond Delta	44.7002	85.6209	f	lac mamm	A	32	60	STH
Microtus pennsylvanicus	7/25/2007	Sabin Pond Delta	44.7002	85.6209	m	scr	A	27	60	STH
Microtus pennsylvanicus	7/25/2007	Sabin Pond Delta	44.7002	85.6209	f	lac mamm	A	*	60	STH
Microtus pennsylvanicus	7/25/2007	Sabin Pond Delta	44.7002	85.6209	f	lac mamm	A	31.5	60	STH
Peromyscus leucopus	7/25/2007	Sabin Pond Delta	44.7002	85.6209	m	scr	A	*	60	STH
Peromyscus leucopus	7/25/2007	Sabin Pond Delta	44.7002	85.6209	m	scr	A	20	60	STH
Peromyscus leucopus	7/25/2007	Sabin Pond Delta	44.7002	85.6209	f	lac mamm	A	17.5	60	STH
Zapus hudsonius	7/25/2007	Sabin Pond Delta	44.7002	85.6209	m	scr	A	13	60	STH
Zapus hudsonius	7/25/2007	Sabin Pond Delta	44.7002	85.6209	m	scr	A	*	60	STH
Zapus hudsonius	7/25/2007	Sabin Pond Delta	44.7002	85.6209	m	scr	A	10.5	60	STH
Zapus hudsonius	7/25/2007	Sabin Pond Delta	44.7002	85.6209	*	*	*	*	60	STH

APPENDIX J - Mammals of the Boardman Valley

Blarina brevicauda	Short-tailed shrew
Canis latrans	Coyote
Castor canadensis	Beaver
Citellus tridecimlineatus	13- lined ground squirrel
Clethrionomys gapperi	Red-backed vole
Condylura cristata	Star-nosed mole
Didelphis virginiana	Opossum
Eptesicus fuscus	Big brown bat
Glaucomys volans	Southern flying squirrel
Lynx rufus	Bobcat
Lasiurus borealis	Red bat
Lasiurus cinereus	Hoary bat
Marmota monax	Woodchuck
Mephitis mephitis	Pine marten
Martes americana	Striped skunk
Microtus pennsylvanicus	Meadow vole
Myotis lucifugus	Little brown bat
Mustella vison	Mink
Mustella frenata	Long-tailed weasel
Lutra canadensis	River otter
Odocoileus virginiana	White-tailed deer
Ondatra zibethicus	Muskrat
Peromyscus leucopus	White-footed mouse
Procyon lotor	Raccoon
Scalopus aquaticus	Eastern mole
Sciurus caarolinensis	Eastern gray squirrel
Sciurus niger	Meadow jumping mouse
Sorex palustris	Water shrew
Sylvilagus floridanus	Masked shrew
Sorex cinereus	Cottontail
Tamias striatus	Eastern chipmunk
Urocyon cynareoagenteus	Red squirrel
Tamiasciurus hudsonicus	Gray fox
Ursus americanus	Black bear
Vulpes vulpes	Red fox
Zapus hudsonius	Fox squirrel

Appendix K - Reptile and Amphibian Species of the Boardman River

Lizards	Binomial
5-lined Skink	<i>Eumeces fasciatus</i>
Snakes	
Water Snake	<i>Nerodia sipedon</i>
Garter Snake	<i>Thamnophis sirtalis</i>
Ribbon Snake	<i>Thamnophis sauritus</i>
Blue Racer	<i>Coluber constrictor</i>
Northern Brown Snake	<i>Storeria dekayi</i>
Red-bellied Snake	<i>Storeria occipitomaculata</i>
Eastern Hog-nosed Snake	<i>Heterodon platyrhinos</i>
Smooth Green Snake	<i>Opheodrys vernalis</i>
Turtles	
Snapping Turtle	<i>Chelydra serpentina</i>
Painted Turtle	<i>Chrysemes picta</i>
Wood Turtle	<i>Clemmys insculpta</i>
Blanding's Turtle	<i>Emydoidea blandingii</i>
Frogs and Toads	
American Toad	<i>Bufo americanus</i>
Spring Peeper	<i>Pseudacris crucifer</i>
Striped Chorus Frog	<i>Pseudacris triseriata</i>
Gray Treefrog	<i>Hyla versicolor</i>
Green Frog	<i>Rana clamitans</i>
Wood Frog	<i>Rana sylvatica</i>
Northern Leopard Frog	<i>Rana pipiens</i>
Bull Frog	<i>Rana catesbiana</i>
Salamanders	
Blue-spotted Salamander	<i>Ambystoma laterale</i>
Spotted Salamander	<i>Ambystoma maculatum</i>
Eastern newt	<i>Notophthalmus viridescens</i>
Red-backed Salamander	<i>Plethodon cinereus</i>
Mudpuppy	<i>Necturus maculosa</i>