



MICHIGAN DEPARTMENT OF NATURAL RESOURCES - www.michigan.gov/dnr
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Michigan Breeding Bird Atlas (I & II) Digital Data Set Project Documentation and Metadata



Includes: the Michigan Breeding Bird Atlas (MBBA) I and Atlas II data, plus compatible GIS “sampling” block layers. The MBBA-I-and-II project data set can be used as conventional tabular data (relational database) or use queries from the data base within GIS with block layer and which allows mapping specific tabular data information or using those data with other GIS data.

Important readers note: This documentation is intended to accompany and support a large, complex digital data set. This involved and detailed technical documentation is required to correctly use that specific digital data set.

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Recommended Citations:

Citation for this document:

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Citation for the packaged digital data set which includes this document/metadata:

MDNR. 2016. The Michigan Department of Natural Resources (MDNR): Michigan Breeding Bird Atlas I and II Digital Data Set, Project Documentation, and Metadata (includes compatible combined Atlas I and Atlas II data, plus compatible GIS block layer). MDNR, Wildlife Division Report 3622. MDNR, Wildlife Division, PO Box 30444, Lansing, Michigan, 48909-7944 USA. 174pg. Revised 2016 August 01. < http://www.michigandnr.com/ftp/wildlife/Michigan_MDNR-Wildlife_breeding-bird-atlas_data_set >.

Michigan Department of Natural Resources Mission Statement:

"The Michigan Department of Natural Resources is committed to the conservation, protection, management use and enjoyment of the state's natural and cultural resources for current and future generations."

Michigan Natural Resources Commission Statement:

The Natural Resources Commission (NRC), as the governing body for the Michigan Department of Natural Resources, provides a strategic framework for the MDNR to effectively manage your resources. The NRC holds monthly public meetings throughout Michigan, working closely with its constituencies in establishing and improving natural resources management policy.



Clarification Regarding MDNR and MDNRE Agency Names: Clarification may be needed for some readers. Before January 2010, the agency was the Michigan Department of Natural Resources (MDNR). As of January 17th, 2010, the MDNR and the Michigan Department of Environmental Quality (DEQ) were merged by a Governor's Executive Order that created a new single department called the Michigan Department of Natural Resources and Environment (MDNRE). After the Nov. 2010 State election, a new Governor's Executive Order was issued January 1st, 2011, which revoked the merger and recreated the two departments of the MDNR and the DEQ from the new MDNRE, effective on March 13th, 2011. During the period of 2010-2011, some reports or other documents may have had the authoring or contact agency as MDNR, then had the MDNRE, and then returned back to MDNR. In reality these agency names both included the Wildlife Division as a subunit of the Department. The MDNR (or MDNRE), Wildlife Division, Lansing Capitol Complex Office, was the primary contact on this project throughout the project.

Executive Summary:

Since 1980, the MDNR has undertaken two statewide projects to catalog the variety of birdlife that is found breeding in the wild in Michigan, otherwise known as the Breeding Bird Atlas1 (BBA1) and the Breeding Bird Atlas2 (BBA2). These projects were contracted to the Kalamazoo Nature Center who mobilized a corps of dedicated volunteers to criss-cross the state and collect data on breeding activity that they observed. The initial project's data collection spanned 1983 to 1988, and the final data set was summarized in the publication of "The Atlas of Breeding Birds of Michigan." The second project's data collection spanned 2001 to 2008 and culminated in the creation of a Breeding Bird Atlas web site (<http://www.mibirdatlas.org/>). With the conclusion of the second project, and in response to significant interest from researchers across the state, the MDNR decided to create a data product that combined the available digital data from both projects, in a cooperating format compatible across both BBA1 and BBA2, and to make this data available for public use. This effort required that the MDNR conduct a systematic data quality control review of the data set from the second project, review the first project data set and consider data cleanup work consistent to be compatible with the second project data set, as well as design a new database structure to house the data from both projects and a mappable GIS data layer to allow for geographical analysis of the breeding bird data. The metadata in this document describes the two source projects, the development of the combination data set, and the resulting data base and geographic data files. This documentation and the accompanying data are served online at http://www.michigandnr.com/ftp/wildlife/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set.

Legal Notices

Notice: This document is not a legal notice or a complete collection of any relevant regulations and laws. It is project information developed for reader's convenience on a specific subject. It is your responsibility as a user of Michigan's public lands, habitat resources, and wildlife, to ensure your activities are lawful and appropriate. Access to laws, regulations and guidelines to assist your enjoyment of Michigan's valuable resources are online and can be obtained from the MDNR website <http://www.michigan.gov/dnr> or by contacting your local MDNR Operations Service Center as listed in your local phone book.

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The data products of the improved BBA1 data set, the BBA2 data set, and the combination Atlas I and II data set and documentation were made possible, data product owned, copyrighted and provided by:



The Michigan Department of Natural Resources, Wildlife Division,
P.O. Box 30444, Lansing, Michigan, 48909-7944;
phone 517-284-9453; website: www.michigan.gov/dnr

Provided initial funds and majority support for the development of the BBA1 and similarly for the BBA2, served as contract coordinator, and retains and serves the final products of the BBA2, the improved BBA1 and the cooperating combination BBA1 and BBA2 data set. This documentation and the packaged project data are served off the internet at http://www.michigandnr.com/ftp/wildlife/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set



The Michigan Nongame Wildlife Fund (MNWF) was the critical funding source for this project. The Michigan Nongame Wildlife Fund provides revenue to the Department to identify, protect, manage, and restore native plant and animal species, natural communities, other natural features, and to promote the knowledge, enjoyment, and stewardship of Michigan's native species and ecosystems for present and future generations.

Files Included in the Complete Packaged Data: 34 files, ~170,755,609 bytes

See [Section 6.6 Comments](#), near the end of the document (page 163) for much more file technical details, sizes, etc.

Note: the files are packaged in a single, compressed "zip" file, which contains the those 31 files explained in this document. The "zip" file = `MichiganDNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set.zip` ,
for a total of ~74,402,987 bytes.

Those 31 files included are:

The project documentation and official metadata file =

`Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_doc_and_metadata.pdf`

The official FGDC metadata listed and provided URL/hyperlink browse graphic =

`Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_browse_graphic.jpg`

The three map figures found within the document (provided for ease of use) =

`Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_map-fig 1_browse_graphic.jpg`

`Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_map-fig-2_browse_graphic.jpg`

`Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_map-fig-3_browse_graphic.jpg`

Four supporting BBA2 project files (cited in document): `MBBAll_Handbook_final_v2010-12-23.pdf` ;

`Bird_breeding_season_species_and_dates_v2011-january-11.pdf` ;

`MBBAll_Casual_Observers_Handbook_v2008-june-19.pdf`; `MBBAll_Point_Handbook_v2011-january-11.pdf`

The tabular (relational database) files detailed in [Section 5](#), in Microsoft Access v2003 software format =

`MichiganDNR_MI-BBA1n2combo_data_set_v2016_-_public_release_-_MS-Access-v2003.mdb`

`MichiganDNR_MI-BBA1n2combo_data_set_v2016_-_public_release_-_MS-Access-v2010.accdb`

The geospatial (GIS) data in ESRI geodatabase detailed in [Section 5](#) =

`MichiganDNR_Breeding_Bird_Atlas_GIS_data.mdb`

The geospatial (GIS) data in ESRI shapefile format (means multiple files define a layer, where same name (left of the dot) but different extension names (right of the dot) like .shp, .shx, .sbn, .sbx, .dbf, .prj):

`MichiganDNR_BBA_Atlas_area_outline_polygon.shp` (+.shx, .sbn, .sbx, .dbf, .prj) or 6 files/

`MichiganDNR_BBA_Atlas_Blocks_polygons.shp` (+.shx, .sbn, .sbx, .dbf, .prj) or 6 files/

`MichiganDNR_BBA_projected_TR_blocks_polygons.shp` (+.shx, .sbn, .sbx, .dbf, .prj) or 6 files.

An ASCII-text-only file listing those files above with details = `README_package_contains_these_files.txt`

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The MDNR would like to recognize the following contributors, sponsors, donors, and participants - without whom the BBA1 and BBA2, plus the Combination data set might not have been possible:

Support for the BBA1 Project:

Sponsors:

Michigan Department of Natural Resources
Michigan Nongame Wildlife Fund
Kalamazoo Nature Center
Michigan Audubon Society
Detroit Audubon Society

Major Donors:

Charles Stewart Mott Foundation
Michigan State University Foundation
Americana Foundation
Michigan Council for the Arts
United States Fish and Wildlife Service
Consumers Power
Michigan United Conservation Clubs
Michigan Department of Transportation
United States Department of Agriculture – Forest Service
Audubon Society of Kalamazoo
SSG LaserWorks
Simpson Paper Company

Other Donors:

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Wildlife Unlimited
Michigan Chapter of The Nature Conservancy
Wetlands Foundation of West Michigan
Kalamazoo Garden Council
Parkview Hills, Kalamazoo
Michigan Conservation Foundation
Chippewa Nature Center
Erie Shores Birding Club
Fernwood Nature Center
Sarett Nature Center
Seven Ponds Nature Center
Amerikal Printers, Kalamazoo
Highbanks of Richland Wildlife Art Gallery
Highbanks Wildlife Art Gallery of Saugatuck
Riecker's Outdoor Gallery, Traverse City
Wild Wings Gallery, Grosse Pointe Farms
Wild Birds Unlimited stores (Battle Creek, Berrien Springs, Kalamazoo, Kentwood, Midland, Okemos, Portage, Royal Oak, Traverse City)
Michigan Audubon Society chapters (Blue Water Audubon Society, Capital Area Audubon Society, Grand Rapids Audubon Society, Jackson Audubon Society, Macomb Audubon Society, Mecosta Audubon Society, Oakland Audubon Society, Petoskey Audubon Society, Thunder Bay Audubon Society)

Support for the BBA2 Project:



**The Michigan Department of Natural Resources,
Wildlife Division,**

P.O. Box 30444, Lansing, MI 48909-7944;
phone 517-284-9453;
website: www.michigan.gov/dnr

\$300,000 to KNC
through a project
contract.
\$322,000 to MNFI
through a project
contract.

Provided initial funds and majority support for the development of the BBA2, similar to BBA1, served as contract coordinator, and retains and serves the final products of the BBA2. This documentation and the packaged project data are online at http://www.michigandnr.com/ftp/wildlife/Michigan_D_NR-Wildlife_breeding-bird-atlas_data_set

Provided in-kind staff specialists' and biologists' time, and expertise for project oversight, guidance, technical review, and publication review.



The Michigan Nongame Wildlife Fund was the critical funding source for this project. The Michigan Nongame Wildlife Fund provides revenue to the Department to identify, protect, manage, and restore native plant and animal species, natural communities, other natural features, and to promote the knowledge, enjoyment, and stewardship of Michigan's native species and ecosystems for present and future generations.

Contract Participants:



The Kalamazoo Nature Center,
7000 North Westnedge Avenue,
Kalamazoo, MI 49009-6309;
phone 269-381-1574;
website: www.naturecenter.org ;

Provided contracted project support.

Provided in-kind staff support.

KNC participated through a contract with the MDNR Wildlife Division, which supplied funds for KNC to coordinate the development of the BBA2 for the State. KNC also contributed funding of approximately \$5,000 per year over the project, and in-kind contributions of staff time and expertise.

Provided ~\$5,000 support per year during field work phases of project.



**The Michigan State University Extension Office's
Michigan Natural Features Inventory,**
P.O. Box 30444, Lansing, MI 48909-7944;
phone 517-373-1552;
website: mnfi.anr.msu.edu

Provided contracted project support.

Provided in-kind staff support, survey and research efforts, specialized survey protocol design, and leveragable data resources.

MNFI was participating through a contract with the MDNR Wildlife Division, which supplied funds for MNFI to conduct field sampling which supported and supplied data to development of the BBA2. MNFI contributed some in-kind contributions of staff time and expertise, plus data products from other data collection projects.



Rouge River Bird Observatory (RRBO),
Environmental Interpretive Center,
University of Michigan – Dearborn,
4901 Evergreen Road, Dearborn, MI 48128;
phone 313-593-5338;
website: www.rrbo.org

Provided in-kind
staff support for
southeast Michigan
surveys and
coordination of
volunteers.

Other Contributors on BBA2 – Such As Those Providing Support Through Contract Participants, Volunteer Data Collection Work in the Field, Consultation or In-Kind Contributions of Expertise, and Data Sharing:



The Arcus Foundation,
402 East Michigan Avenue,
Kalamazoo, MI 49007;
phone 269-373-4373;
website: www.arcusfoundation.org

Provided \$150,000
to KNC.



Herbert H & Grace A Dow Foundation,
1018 West Main Street,
Midland, Michigan 48640-4292;
phone: 989-631-3699;
website: hhdowfdn.org

Provided \$75,000
to KNC.



The Michigan Audubon Society,
6380 Drumheller Road,
Bath, MI 48808;
phone 517-641-4277;
website: www.michiganaudubon.org

Provided ~\$50,000
to KNC, and in-kind
support by volunteer
contribution of effort
to collect field
observations



The Frey Foundation,
40 Pearl Street, NW Suite 1100,
Grand Rapids, MI 49503,
phone: 616-451-0303;
website: www.freyfdn.org

Provided \$40,000
to KNC.



The Saginaw Bay Watershed Initiative Network,
P.O. Box 734, Bay City, MI 48708;
phone 989-892-9171;
webpage: www.saginawbaywin.org

Provided \$30,000
to KNC.



University of Michigan-Dearborn,
4901 Evergreen Road, Dearborn, MI 48128;
phone 313-593-5000;
webpage: www.umd.umich.edu

Provided \$26,000
to RRBO.



U.S. Fish and Wildlife Service,
BHW Federal Building, 1 Federal Drive,
Fort Snelling, MN 55111;
phone 612-713-5301;
webpage: www.fws.gov/midwest

Provided \$17,000
to KNC



James A. and Faith Knight Foundation,
180 Little Lake Drive, Suite 6B,
Ann Arbor, MI 48103;
phone 734-769-5653;
webpage: www.knightfoundationmi.org

Provided \$15,000
to RRBO.



Kalamazoo Community Foundation,
151 South Rose Street, Suite 332,
Kalamazoo, MI 49007-4775;
phone 269-381-4416;
webpage: www.kalfound.org

Provided \$8,000
to KNC.

Raymond J. Adams, Jr.
Ornithologist (retired)

Provided in-kind
support and
invaluable technical
expertise and input
on BBA1 and BBA2
project specifics

Elizabeth Owczarzak
Lansing Community College Student and Intern,
Volunteer, working in GIS and data management

Provided in-kind
support through
technical review

Additional valued support and funding was provided
over the duration of the BBA2 project. We extend our thanks and
appreciation to these individuals, organizations, and agencies not
noted above.

Provided funds and
in-kind support
to KNC.

Timeline:

The following timeline is provided to help understand the relationship between the projects and work over time. The information and dates can get confusing at times, and hopes are that this helps in understanding events which result in this final product discussed in this document:

<i>year</i>	<i>event</i>
1983 to 1988	BBA1 data collection dates
1991	KNC BBA1 book
2000	KNC, MDNR and MNFI digital data set for BBA1 with improvements
2001 to 2008	BBA2 data collection dates
2011	KNC BBA2 book
2010 to 2014	MDNR work on the Combination BBA1-and-BBA2 data set relational-data-base and GIS data layers
2016	MDNR data set and documentation completed

List of Abbreviations:

The following important abbreviations are used in this document, but may not be familiar to all readers, so they are listed here for reference.

<i>abbreviation</i>	<i>meaning</i>
BBA1	Breeding Bird Atlas I (context will indicate if it is the Atlas or the data set)
BBA2	Breeding Bird Atlas II (context will indicate if it is the Atlas or the data set)
MDNR	Michigan Department of Natural Resources
GIS	geographic information system
GPS	global positioning system
KNC	Kalamazoo Nature Center
LP	lower peninsula
MNFI	Michigan Natural Features Inventory of the Michigan State University Extension
NORAC	North American Ornithological Atlas Committee
NLP	northern lower peninsula
PLSS	Public Land Survey System
SLP	southern lower peninsula
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
UP	upper peninsula
USGS	United States Geological Survey

Introduction

To This Project:

Michigan has twice (1983-1988 and 2001-2008) collected bird observation data in support of statewide breeding bird atlas projects. These projects were initiated by the Michigan Department of Natural Resources and contracted to the Kalamazoo Nature Center for data collection, processing, and production of printed atlases. Data collection methodology is based on NORAC standards which allow for recording of breeding behavior as well as basic species, date, and location data. Observation locations for both projects were organized into survey blocks based on boundaries established within the PLSS by the US General Land Office (GLO; now part of US Department of Interior, Bureau of Land Management). Where necessary, these PLSS boundary lines were extended into unsurveyed areas to ensure that all land areas in the state of Michigan were included within recognized survey blocks. Both projects were heavily dependent on volunteer data collection, but both also implemented significant surveying by specially hired surveyors. The digital data files from both of these projects, containing both the textual bird observation data and geographical data delimiting survey block boundaries, were combined by the DNR, and baseline error checking and correction was conducted. The BBA1 digital data set consists only of the single observation for each species in each block for which the breeding behavior code provided the highest confidence that breeding had occurred. The BBA2 digital data set may provide multiple observations of individual species in any survey block, but only one record per species, representing the observation with the highest breeding behavior code, was included for a single survey form. On this basis, the two data sets are not directly comparable in terms of comparisons of number of birds or estimates of survey effort (e.g., calculations of species observed per hour or number of observations submitted).

To This Document and Metadata Content Standards:

Before beginning the data details about the Michigan Breeding Bird Atlas data set, it's important to be clear for any novice metadata readers about what this project documentation and metadata actually contains. This portion of the introduction is to assist those readers or users who are not very familiar or comfortable with more formal metadata for digital data sets. Metadata is sometimes difficult, complicated and can contain widely-variable information materials, which is why many data users incorrectly skip a review of the project documentation and metadata before they actually use those data during their specific project. These introductory statements are to stress our recommendation to review this project documentation and metadata, to avoid wasting your time with a complex data set without reading all the metadata, avoid creating misunderstood results, etc. It is in your best interest to review these presented materials.

A brief explanation of what kind of information this document presents to readers is needed because “metadata” as a concept is often misunderstood and therefore skipped. The term “metadata” is typically defined as “data about data”, is considered an ambiguous term and is used to document descriptive information like content or process

details, and structural or technical details. These may seem like fundamentally different concepts, but it's all specifics about companion data - either specifics about the actual data values and types of data in that companion data set, or the “container” or format details about that data set. Metadata is becoming more and more important in science as a way to communicate very important information, created to document completed data and facilitate others using those data, and is becoming a United States Federal requirement of projects where taxpayer funds are used to pay for development of various data resources. See additional explanations of what metadata is, why it is used, benefits for you as a reader or data user, etc. at Wikipedia. 2011. “Metadata”. http://en.wikipedia.org/wiki/Metadata#Metadata_types . Entry Dated 2011 March 01. Wikipedia, of the Wikimedia Foundation, Inc.

Within this document after this brief introduction, this report includes metadata in the Federal Geospatial Data Committee (FGDC) Metadata Standard for Geospatial Data with the biological information add-on standard which was originally developed by the National Biological Information Infrastructure (NBII) as an add-on standard format pieces for attribute data with biological components (in this case avian species information). This project documentation and metadata presents both descriptive and structural metadata with specific details to help users of BBA1 and BBA2 project data by providing details about the structure, contents, and context of those data files developed during the BBA2 project. The FGDC Standard and the NBII Standard are both National and internationally -recognized and awarded standardized information reporting formats to unambiguously document complex data products which include both a spatial location component and a specific biological information component. More information about the specific FGDC and NBII standard blocks are provided at FGDC at <http://www.fgdc.gov> .

Important Considerations:

The user (reader) is responsible for reading and comprehending all portions of these metadata before using any of the companion data. Any use of these data signifies a user's understanding of all stated warnings, disclaimers, and notices and agreement to comply with all stated constraints in these metadata/data. The Michigan Department of Natural Resources (DNR) provides these metadata and companion data without any express or implied warranties, including, without limitation, the implied warranties of merchantability and fitness for a particular purpose. The MDNR shall not be held liable for improper or incorrect use of these data, and these data are not intended for legal use. The MDNR reserves all rights and copyrights as appropriate as the steward for these data for the public trust; these data may not be repackaged or sold. The information contained in these data may have changed since the dataset was last updated. Newer versions of these data may be available on an irregular schedule and the dataset may be updated without notice; however that statement does not mean these metadata or data will ever be changed again (rather that the possibility is always reserved). For more information, communicate with the contact person listed in this metadata file for these data. Do not pass these data to other users; direct other users seeking these metadata or companion data to the contact person listed in this metadata file or the provided data access and download location.

There are other warnings, disclaimers and notifications prepared for possible end users of these metadata and companion data – ensure you read all the provided information to avoid causing yourself problems related to use of these data. Some statements may be repeated, as they are appropriate content for blocks in a specific metadata format being used to document the project information and the companion data set. Metadata formats help create similar notice blocks for communicating information to potential end users, and these metadata have been written for both those inexperienced with technical documentation and those familiar with the standard format used for these metadata or data packaging. Ensure you read Sections 1.7 (Access Constraints) and Section 1.8 (Use Constraints) for directly relevant details affecting users.

Section 1: Identification Information:

(1.) Identification_Information:

(1.1) Citation:

Citation_Information:

- (1.1.1) Originator: The Michigan Department of Natural Resources (DNR), Wildlife Division
- (1.1.2) Publication_Date: 2012-10-23
- (1.1.3) Publication_time: (not applicable).
- (1.1.4) Title: The Michigan Breeding Bird Atlas (I and II) Digital Data Set, Project Documentation, and Metadata - includes combined Atlas I and Atlas II data, plus compatible GIS sampling block layer in cooperating tabular and vector digital data formats.
- (1.1.5) Edition: (use publication date)
- (1.1.6) Geospatial_Presentation_Form: atlas (of observational data within a pseudo-block framework)
- (1.1.7) Series_Information: (not applicable).
- (1.1.8) Publication_Information:
 - (1.1.8.1) Publication_Place: Lansing, MI
 - (1.1.8.2) Publisher: The Michigan Department of Natural Resources (DNR), Wildlife Division
- (1.1.9) Other_Citation_Details: See other details provided in other appropriate section of this data documentation or metadata file.
- (1.1.10) Online linkage: http://www.michigandnr.com/ftp/wildlife/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set
- (1.1.11) Larger_Work_Citation: (not applicable).

(1.2) Description:

- (1.2.1) Abstract: The Michigan Breeding Bird dataset was created from (a.) data collected for the First Breeding Bird Atlas of Michigan by the Kalamazoo Nature Center, Kalamazoo, MI, during 1983-1988; (b.) data collected for the Second Breeding Bird Atlas of Michigan by the Kalamazoo Nature Center, Kalamazoo, MI., during 2001-2008; and (c.) a compatible geographic information system (GIS) data layer of sampling blocks for all of Michigan, created by the Michigan Department of Natural Resources, Wildlife Division. Breeding bird surveying was conducted on a random sample of quarter-township blocks during 1983-1988 and 2001-2008. The data set covers the complete geographic extent of the State of Michigan; however not all Atlas blocks in the complete state block coverage have observations. Although the data is geographically compatible by using the block GIS layer (where each block is approximately 3 miles by 3 miles), these data do not have to be used in GIS but can be used as tabular data on Michigan breeding bird populations and observations over the BBA1 and BBA2 time periods. There are several important user notices, warnings, and caveats. Please read the entire metadata documentation to ensure you are informed, use these data appropriately, and don't waste your time with data activities which are invalid based on limitations of the data.
- (1.2.2) Purpose: The purpose of this project was to package and provide BBA data for use by those interested, complete good data set assembly and documentation, and put the BBA1 and BB2 data into a compatible system to be used both in tabular data activities and GIS. The BBA2 project was conducted to quantify changes in individual species' distributions, provide current species' spatially explicit occurrence data to aid in conservation planning, and to provide species baseline data for those

- species not documented well in the BBA1 project. The purpose of the BBA1 and BBA2 projects was to document the ranges of all of the species of wild breeding birds in Michigan. In addition, steps were taken to quantify the confidence with which a species was designated as breeding or nonbreeding. Starting with BBA2, data was collected in a manner to allow for rudimentary analysis of breeding phenology. By combining these two data sets into a relatively user friendly database and including a statewide GIS survey block data layer, the MDNR will be able to distribute the data from these publicly funded projects for wide use by researchers, conservationists, and other stakeholders with the hope that additional use can be made of the data to support bird research and conservation.
- (1.2.3) Supplemental_Information: See other details provided in other appropriate sections of this data documentation or metadata file.
- (1.3) Time_Period_of_Content:
Time_Period_Information:
(1.3.1) Single_Date/Time: (not applicable).
(1.3.2) Multiple_dates/Times:
More appropriate to represent as range of dates and times, with interruptions when sampling season ended before being restarted.
(1.3.3) Range_of_Dates/Times:
(1.3.3.1) Beginning_Date: 1983
(1.3.3.3) Ending_Date: 2008
Comment: The combined data set is from data collected for (a.) the First Breeding Bird Atlas of Michigan by the Kalamazoo Nature Center, Kalamazoo, MI, during 1983-1988; and (b.) the Second Breeding Bird Atlas of Michigan by the Kalamazoo Nature Center, Kalamazoo, MI., during 2001-2008.
(1.3.4) Currentness_Reference: publication date
- (1.4) Status:
(1.4.1) Progress: complete
(1.4.2) Maintenance_and_Update_Frequency: none planned
- (1.5) Spatial_Domain:
(1.5.1) Bounding_Coordinates:
(1.5.1.1) West_Bounding_Coordinate: 90.4184554558829
(1.5.1.2) East_Bounding_Coordinate: -82.1229794597051
(1.5.1.3) North_Bounding_Coordinate: 48.3058925124996
(1.5.1.4) South_Bounding_Coordinate: 41.6968483738356
Bounding_Coordinates_supplemental_information: These bounding coordinates are provided in standard geographic longitude and latitude decimal degree values (as is the standard response for providing spatial domain coordinates). However, users need to be aware that the geographic data coordinate system is not in standard geographic longitude and latitude decimal degree values, but is in the Michigan Georeference Projection (see the Spatial_Reference_Information in Section 4, for more details).
(1.5.2) Data_Set_G-Polygon:
(1.5.2.1) Data_Set_G-Polygon_Outer_G-Ring:
Use the Bounding Coordinates because this outer polygon is detailed, irregular, and a huge number of coordinates.
(1.5.2.2) Data_Set_G-Polygon_Exclusion_G-Ring: not applicable
- (1.6) Keywords:
(1.6.1) Theme:
(1.6.1.1) Theme_Keyword_Thesaurus: none
(1.6.1.2) Theme_Keyword: breeding bird

- (1.6.1.3) Theme_Keyword: species range
- (1.6.1.4) Theme_Keyword: species distribution
- (1.6.1.5) Theme_Keyword: bird atlas
- (1.6.2) Place:
 - (1.6.2.1) Place_Keyword_Thesaurus: none
 - (1.6.2.2) Place_Keyword: Michigan
- (1.6.3) Stratum:
 - (1.6.3.1) Stratum_Keyword_Thesaurus: none
 - (1.6.3.2) Stratum_Keyword: (not applicable; no vertical component to data set)
- (1.6.4) Temporal:
 - (1.6.4.1) Temporal_Keyword_Thesaurus: none
 - (1.6.4.2) Temporal_Keyword: 2014
 - (1.6.4.3) Temporal_Keyword: 1983-2008
 - (1.6.4.4) Temporal_Keyword: 2001-2008
 - (1.6.4.5) Temporal_Keyword: 1983-1988
- (1.7) Access_Constraints:

Legal Warnings, Disclaimers, and Notifications for Access to these metadata and data:

This portion of the documentation is to provide legal statements, restrictions, and prerequisites for accessing the data set, including those to assure protection of privacy, assure protection of intellectual property, assure protection of those involved (e.g., data developers, provider and potential end users), provide and explain any special restrictions or limitations on obtaining the data set, and provide other reasonably-expected information needed by potential end users when considering accessing these metadata and described data.

There are several important notices, warnings, access and use statements for any potential user of these data. These constraints and warnings are to ensure protection of the data, State property (including physical, digital and intellectual property), and both the developers and potential end users by appropriately discussing these data and data development factors. Some of these same warnings may be duplicated in sections of longer documentation, however, read the entire metadata document carefully to ensure that all data use issues are completely understood.

It is assumed that all users of these data have read all metadata or summary files provided with these matching data resources. These stated constraints and warnings are a combination of official MDNR policy statements at the time this metadata was last updated, State of Michigan statements, conventional or metadata-format required technical statements, and added explanatory and geospatial-related qualifiers provided for users of any geospatial data included with this file. These data comments are not specific to just geospatial (location) details, but also relate to attributes and other data factors of these data, documented by these metadata comments. These warnings and statements have been carefully gathered, and significant attempts made to present and explain them for potential users. If you disagree with any of these warning comments, do not use these data or these data resources packaged with this metadata.

The following data liability disclaimer applies: data is considered “as is” at the time this metadata was written or last updated; these data are not for cadastral or legal use, even after considered published. Users should be aware that in comparison with other data sets for the same area, inaccuracies and inconsistencies may be identified due to (a.) previous data creation methods, (b.) changes mapping conventions over time, (c.) changes in technology, (d.) changes in understandings of what details need to be documented, and (e.) other such factors impacting data creation, documentation, and packaging product data and documentation.

Best efforts have been made with respect to both the details in this metadata documentation, matching data described in this metadata, packaging, and access and download preparations for both these metadata and the companion data (including other documents or digital files packaged with the project data).

Regarding downloading: Any downloading and/or use of these data signifies a user's agreement to comprehension and compliance with all stated constraints and warnings in this metadata file. Insure all portions of any metadata are read and clearly understood before using these data in order to protect both user and data-developer interests. Review of this metadata information doesn't limit a potential user's access to consider the warnings and restrictions; any downloading or use of the data partnered with these metadata details means you as a user agree to all terms and conditions stated within these metadata and with accessory files included with those data referred to by these metadata.

Regarding updates or changes: These data resources may be a updated and the related data layer(s) could be updated or changed without notice. It is strongly recommended that users regularly check for updates of these data. It is also strongly recommended that careful attention be paid to the contents of metadata and any other files associated with these data.

Be aware that additional constraints may have been added since the compilation and completion of this metadata summary file. Every effort has been made to provide users with the best information, however updated data and metadata information may have changes.

(1.8) Use_Constraints:

Legal Warnings, Disclaimers, and Notifications for Use of these metadata and data:

This portion of the documentation provides legal statements, restrictions, and prerequisites for using the data set, including those to ensures protection of privacy, ensures protection of intellectual property, ensures protection of those involved (e.g., data developers, provider and potential end users), provides and explains any special restrictions or limitations on using the data set, and provides other reasonably expected information needed by potential end users when considering using these metadata and described data.

There is no expressed warrantee; the State of Michigan, the Department of Natural Resources nor any employees shall be held liable for any portions of these metadata or companion data, or for improper or incorrect use of any information provided, data described and/or contained herein. Although these data have been processed successfully on computer systems at the Michigan Department of Natural Resources and the MDNR Wildlife Division (WLD), no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general, scientific, or legal purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. These data are provided "as is" and without any express or implied warranties, including, without limitation, the implied warranties of merchantability and fitness for a particular purpose. If other files are provided with these data, see those associated files for more information including some details which may not be summarized in these metadata.

The companion data are not legal information or documents and are not to be used as such. These data involve geographic and attributed representations which might be related to property representations, jurisdictional ranges, or enforcement-related

regulations and rules. Because these issues are critical for both data developers and potential end users, these are carefully explained here.

The information presented or in these data may represent some details which might be relevant to geographic areas, land, land use, rules and regulations, or other natural resources. However, be aware and avoid making incorrect assumptions or misunderstandings of applicability of these data (e.g., using these data beyond intended purposes or scales, etc.). These documentation and data products are a tool issued to assist with this specific subject with specific applicable conditions.

Regarding representations, implied official geographic representations which might be seen in these data, or such information which might be possibly misunderstood by potential end users: The boundary outline information contained in these data are for identification of regional areas on larger scales, and is not a legal or notarized survey system nor judicially recognized property line system. The boundary outline information contained in these data are based on the best available Public Land Survey System data for town, range and section level land ownership frameworks for the State of Michigan at the time these data were developed. Newer information may have been provided since these data were developed and, if so, may be available from the Department of Technology, Budget and Management (DTMB) at the Michigan Geographic Data Library (MGDL) website at <http://www.mcgi.state.mi.us/MGDL>.

These data include polygons and attribute information which are similar or related to representations of PLSS, property boundaries, county or State boundaries. However the context of these data is not intended to represent those possible property or jurisdictional related factors, but are instead a frame for observational data collected within those boundaries. Beware repurposing these data incorrectly beyond their intended purposes of data collection or use.

Regarding jurisdictions, implied jurisdictions which might be seen in these data, or such information which might be possibly misunderstood by potential end users:

There is not any attempt, in either these data, metadata, data design, products or documentation of these data, to define the limits of the proprietary jurisdiction of any Federal, State, or local government, or to establish the geographical scope of the regulatory programs of such government agencies. Governmental agencies means any Federal or adjoining Nation, State (including adjoining States), local government or municipality (meaning a county, township, city, village), governing body (meaning the board, council, commission, or body in which the policy-making powers of the local government are vested), public agency (meaning a single- or multi-purpose public body, etc.), authority (meaning an authority formed by according to the Michigan Municipal Partnership act or other official State recognized authority), Michigan Indian tribe (meaning a Federally recognized Indian tribe, band, nation, or other organized group or community of Indians that is recognized as eligible for services by the United States secretary of the interior because of their status as Indians, and that has trust lands located within this State); all defined as per (a.) the Michigan Compiled Laws, Municipal Partnership Act (Michigan Compiled Laws, Municipal Partnership Act, Act 258 of 2011, Section 124.112 Definitions, Sec. 2, Item J., Eff. Dec. 14, 2011 ; accessed online at <http://legislature.mi.gov/doc.aspx?mcl-28-602>); (b.) the Michigan Compiled Laws, Commission on Law Enforcement Standards Act (Michigan Compiled Laws, Commission on Law Enforcement Standards Act, Act 203 of 1965; Section 28.602 Definitions; Sec. 2, Item J; Eff. Oct. 12, 2004; accessed online at <http://legislature.mi.gov/doc.aspx?mcl-28-602>); and (c.) the Michigan Compiled Laws,

Municipal Sewage and Water Supply Systems Act (Michigan Compiled Laws, Municipal Sewage and Water Supply Systems Act, Act 233 of 1955; Section 124.281 Definitions; Sec. 1, Item C and D; Eff. Dec. 14,2009; accessed online at <http://legislature.mi.gov/doc.aspx?mcl-124-281>).

Potential users must consult other more appropriate information resources if need to relate these data or the represented geographic extents to legal representation of properties, formal boundaries, or other depictions of any official extents (i.e. relate these data to an official county extent). Property ownerships may have changed since these data were created and updated. All potential users should be aware that there could be instances where the represented boundaries or ownership (as may be seen in these data) may be quite different than actual ownership (for the real-world, current situation). Specific geographic areas could be out of date due to changes in the real world since these data were developed and packaged.

Regarding apparent or implied regulations, rules, enforcement related information which might be seen in these data, or such information which might be possibly misunderstood by potential end users:

These documentation details and these companion data are not a set of rules and regulations (either in excerpt or complete), and may not be as immediately updated as current legislation and rules relevant to these data. These documentation or data products are not legal notice nor a collection (either in excerpt or complete) of possible rules, regulations and laws which might be valid and applicable for the represented geographic areas, subjects or context.

Regulatory, rules and management authority has been conferred on the MDNR by section 504 of 1994 Public Act 451, Michigan Compiled Laws 324.504; the official Michigan Compiled Laws are accessible online at <http://legislature.mi.gov/doc.aspx?mcl-324-504>. The official and full legal representations of any enforcement-related information are those official text documents such as Public Laws, Acts of government, amendments to the Michigan Wildlife Conservation Orders, Director's Orders, or other appropriate legal code. It is possible that these data contain polygons which could be considered direct representations of enforcement related areas (townships, State extent, etc.); however, these polygons are data tools to assist. A complete listing of regulations and legal descriptions are available on the MDNR website at <http://www.michigan.gov/dnrlaws>, and this internet location includes links to other State governmental archives for data beyond the DNR.

Regarding plans or activities of potential users, based on these metadata and companion data:

Potential users intending to engage in activities involved within or adjacent to lands controlled by private landowners or properties controlled by any government agencies (as defined earlier in these warnings) should seek appropriate permissions and additional information before planning any activities. These data do not provide sufficient details to define land extents, land use or access issues, extents concerning specific regulations, specified agency regulatory programs, proprietary jurisdictions that may affect activities, etc. Do not misunderstand the existence of observational data within a specific geographic area, within these data, as permission for potential end users to go into portions of that geographic area.

Potential users of these data should contact appropriate agency staff and should discuss the current ownership, rules and regulations, and other situations with local

knowledgeable contacts before engaging in any activities which could be unlawful, illegal, violations or cause various possible repercussions, penalties, civil or criminal infractions, fees or fines, and/or jail-time for potential end users.

It is the responsibility of each individual, as a user of public lands, to ensure they are informed of all current rules and regulations relevant to planned activities before doing those planned activities. Contact MDNR offices if you have questions or to verify regulations relating to possible activities before engaging in those activities. A complete listing of regulations and legal descriptions are on the MDNR website www.michigan.gov/hunting under “Laws & Legislation.”

Regarding rights, copyrights, etc., the MDNR retains all rights to these metadata, data, physical and conceptual materials, and related information products. These data are not to be repackaged or sold by other parties, as owned by the DNR. The DNR, in public trust for the citizens of Michigan, retains the Rights, Copyrights, and all other expressed or implied legal rights over these data, these information resources and tools, etc.

Use of trade names or commercial product names is solely for the purpose of providing specific information, reporting data development environments and methods, and does not imply blanket recommendation or endorsement by Michigan State Government, the DNR, the Wildlife Division, or any associated staff.

Assistance and development of these metadata and companion data: The MDNR and the MDNR Wildlife Division do consider possible project cooperation opportunities; the MDNR does work with many agencies and cooperators on projects using MDNR information resources, ideas, etc. as part of continued mission and goals. However, any cooperative project idea or relationship requires consideration, discussion, a data use agreement, and other details be developed and finalized. If interested, discuss the situation with the data contact on this metadata document.

(1.9) Point_of_Contact:

(1.9.1) Contact_Person_Primary:

(1.9.1.1) Contact Person: Karen Cleveland or alternate/ secondary contact Marshall Strong, but recommend using the contact position and/or contact organization, listed below.

(1.9.1.2) Contact_Organization: State of Michigan, Department of Natural Resources, Wildlife Division

(1.9.2) Contact_Organization_Primary: State of Michigan, Department of Natural Resources, Wildlife Division.

(1.9.3) Contact_Position: MDNR Wildlife Division’s All Bird Biologist or Specialist, or the alternate / secondary contact of MDNR Wildlife Division’s Mapping and Geo-technology Program Specialist.

(1.9.4) Contact_Address:

(1.9.4.1) Address_Type: mailing address

(1.9.4.2) Address: P.O. Box 30444

(1.9.4.3) City: Lansing

(1.9.4.4) State_or_Province: MI

(1.9.4.5) Postal_Code (ZIP or ZIP+): 48909-7944

(1.9.4.6) Country: United States of America

(1.9.5) Contact_Voice_Telephone: 1-517-284-9453

(1.9.6) Contact_TDD/TTY_Telephone: 711 (Michigan Relay Center)

(1.9.7) Contact_Facsimile_Telephone: 1-517-373-9566

- (1.9.8) Contact_Electronic_Mail_Address: DNR-Wildlife@michigan.gov ; Those interested can also see the MDNR website online at <http://www.michigan.gov/dnr> for more information.
- (1.9.9) Hours_of_Service: recommended Universal/GMT 12noon to 8pm, or United States Eastern Standard Time 8am to 5pm
- (1.9.10) Contact_Instructions: No significant instructions, other than: (a.) Please have patience as it may take a couple of days to reply back to questions, depending on the methods used (email, etc.) to contact our organization; (b.) please refer to this data set by its proper name of “Michigan Breeding Bird Atlas data set” or other relevant details, in any message or with questions.
- (1.10) Browse_Graphic:
 - (1.10.1) Browse_Graphic_File_Name: Michigan_DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_browse_graphic.jpg .
 - (1.10.2) Browse_Graphic_File_Description:
 - (1.10.3) Browse_Graphic_File_Type: JPG / JPEG (Joint Photographic Experts Group format).
 - (1.10.4) Online_Browse_Graphic_File_Location:
http://www.michigandnr.com/ftp/wildlife/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set/Michigan_DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_browse_graphic.jpg .

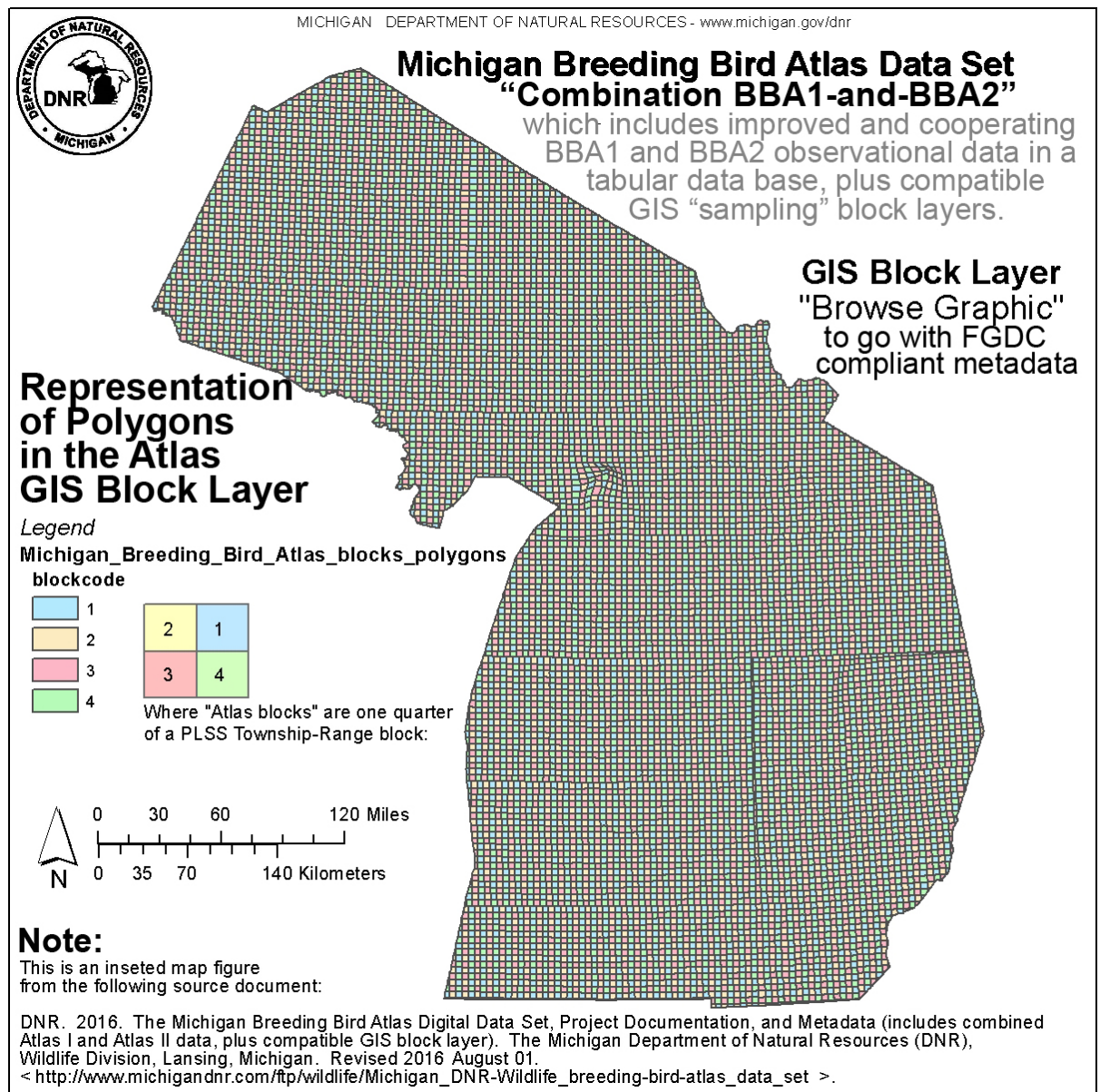


Figure 1. Data set browse graphic, showing the Atlas blocks layer for all Michigan.

(1.11) Data_Set_Credit:

(1.11.1) BBA1 source data set:

Citation: Brewer, R., G.A. McPeck, and R.J. Adams Jr., editors. 1991. The Atlas of Breeding Birds of Michigan. Michigan State University Press, East Lansing, Michigan, USA. <http://www.mibirdatlas.org> Accessed 10 October 2011.

Comment: BBA1 project and dataset: Data collection, data entry, and creation of "The Atlas of Breeding Birds of Michigan" were coordinated by the Kalamazoo Nature Center. KNC additionally produced a tabular file containing the highest breeding code observed for each species in each applicable survey block.

Citation_Abbreviation: BBA1.

(1.11.2) BBA1 shapefile:

Citation: Kalamazoo Nature Center, Michigan DNR Wildlife Division, and Michigan Natural Features Inventory. 2000. The Michigan Atlas of Breeding Birds GIS Block layer. Michigan Natural Features Inventory, Lansing, Michigan, USA.

Comment: The Michigan Department of Natural Resources performed basic quality control tests on this file (e.g., checking for correct spelling of common names, checking for valid breeding codes) and generated an ESRI compatible GIS data file identifying survey block centroids (points) which incorporated the tabular file data and provided the capability for geographically based analysis of project data.

Citation_Abbreviation: BBA1 Shapefile.

(1.11.3) BBA2 source data set:

Citation: Chartier, A.T., J.J. Baldy, and J.M. Brenneman, editors. 2011. The Second Michigan Breeding Bird Atlas. <http://www.mibirdatlas.org> Accessed 30 September 2011.

Comment: BBA2 project and dataset: Data collection and data entry were coordinated by the Kalamazoo Nature Center. Specialized species surveys (e.g., grassland birds, secretive marshbirds, nocturnal birds, etc.) were conducted by the Michigan Natural Features Inventory based on protocols developed by MNFI. KNC produced a Microsoft Access database containing highest breeding code observed on each survey form/card for each species in each applicable survey block.

Citation_Abbreviation: BBA2.

(1.11.4) BBA2 shapefile:

Citation: Kalamazoo Nature Center, Michigan DNR Wildlife Division, and Michigan Natural Features Inventory. 2008. The Michigan Atlas of Breeding Birds GIS Block layer. Michigan Natural Features Inventory, Lansing, Michigan, USA.

Comment: The Michigan Department of Natural Resources performed basic quality control tests on this file (e.g., checking for correct spelling of common names, checking for valid breeding codes) and generated an ESRI compatible GIS data file identifying survey block centroids (points) which incorporated the tabular file data and provided the capability for geographically based analysis of project data.

Citation_Abbreviation: BBA2 Shapefile.

(1.11.5) Michigan Breeding Bird Atlas “Combination BBA1-and-BBA2” data set:

Citation: Michigan DNR Wildlife Division. 2012. Michigan Breeding Bird Atlas data set. Michigan Department of Natural Resources, Lansing, Michigan, USA.

Comment: Note: This element is the database component of “The Michigan Breeding Bird Atlas Digital Data Set, Project Documentation, and Metadata (includes Atlas I and Atlas II data, plus compatible GIS block layer).”

The Michigan Department of Natural Resources performed basic quality control tests on this database to remove or otherwise rectify invalid species codes, breeding codes, and survey block designations. The MDNR restructured the database such that it more closely conformed to the requirements of third normal form, created indexes to improve query functionality, and combined the BBA1 and BBA2 datasets to allow for simplified analyses between atlas projects. The MDNR verified individual species observations on a subset of the database to better quantify data quality issues.

Citation_Abbreviation: MDNR Wildlife Division “Combination BBA1and2” Data.

(1.11.6) Michigan Public Land Survey System data/information:

Citation: MGD. 2012. Michigan Geographic Data Library (MGDL; serving Michigan geographic information system data resources to public). State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. <http://www.mcgi.state.mi.us/mgdl>. Accessed 11 October 2014.

Comment: The Michigan PLSS is a specific set of information about the PLSS irregular grid system for the State of Michigan, and:

(a.) the Michigan geospatial data comes from the source:

MGDL. 2012. Michigan Geographic Data Library (MGDL; serving Michigan geographic information system data resources to public). State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. <http://www.mcgi.state.mi.us/mgdl>. Accessed 11 October 2014.

(b.) the PLSS is structured according to the standards and practices from the citation:

BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System (PLSS) manual). Bureau of Land Management (BLM; 1946 to present) and Government Land Office (GLO; 1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA; telephone 1-202-208-3801; facsimile 1-202-208-5242; e-mail questions@blm.gov; <http://www.blm.gov>. Publication is available at <http://www.blmsurveymanual.org/index.html>; hardcopy available from the U.S. Government Printing Office at <http://www.gpo.gov>. Accessed 2012 October 11.

Citation_Abbreviation: Michigan PLSS GIS layer.

(1.11.7) MDNR Breeding Bird Atlas Blocks GIS layers:

Citation: MDNR Wildlife Division. 2012. The Michigan Breeding Bird Atlas Block GIS layer, outline, and town-range layer Data Set. Michigan Department of Natural Resources, Lansing, Michigan, USA.

Comment: This is the combination of the three GIS data layers of (a.) the Michigan Breeding Bird Atlas Block GIS layer, (b.) the Michigan Breeding Bird Atlas outline layer – a simple outline of all the BBA Blocks, and (c.) Michigan Breeding Bird Atlas projected town-range block layer. Note that none of these are very useful at all without the tabular Access database containing all the observational data (see Section 1.11.4).

Citation_Abbreviation: MDNR Breeding Bird Atlas Blocks GIS layers.

(1.11.8) Michigan Breeding Bird Atlas “Combo-BBA1-2” Complete Digital Data Set with documentation:

Citation: MDNR Wildlife Division. 2012. The Michigan Breeding Bird Atlas Complete Digital Data Set. Michigan Department of Natural Resources, Lansing, Michigan, USA.

Comment: Combined tabular Access database containing all the observational data (see Section 1.11.4) with all the product GIS layers (see Section 1.11.6).

Digital data should be kept with the project documentation:

Michigan DNR. 2012. The Michigan Breeding Bird Atlas Digital Data Set Project Documentation and Metadata (includes combined Atlas I and Atlas II data, plus compatible GIS block layer) in The Michigan Breeding Bird Atlas Digital Data Set, Project Documentation, and Metadata (includes combined Atlas I and Atlas II data, plus compatible GIS block layer). The Michigan Department of Natural Resources (DNR), Wildlife Division, Lansing, Michigan. Revised 2012 November 02. http://www.michigandnr.com/ftp/wildlife/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set

Citation_Abbreviation: MDNR Wildlife Division Combo-BBA1-2 Project Documentation and Metadata.

(1.11.9) Michigan Breeding Bird Atlas Project Documentation and Metadata:

Citation: Michigan DNR. 2012. The Michigan Breeding Bird Atlas Digital Data Set, Project Documentation, and Metadata (includes combined Atlas I and Atlas II data, plus compatible GIS block layer). The Michigan Department of Natural Resources (DNR), Wildlife Division, Lansing, Michigan. Revised 2012 November 02. http://www.michigandnr.com/ftp/wildlife/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set.

Comment: Digital data should be kept with the project documentation:

Michigan DNR. 2012. The Michigan Breeding Bird Atlas Digital Data Set Project Documentation and Metadata (includes combined Atlas I and Atlas II data, plus compatible GIS block layer) in The Michigan Breeding Bird Atlas Digital Data Set, Project Documentation, and Metadata (includes combined Atlas I and Atlas II data, plus compatible GIS block layer). The Michigan Department of Natural Resources (DNR), Wildlife Division, Lansing, Michigan. Revised 2012 November 02. http://www.michigandnr.com/ftp/wildlife/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set

Citation_Abbreviation: MDNR Wildlife Division Combo-BBA1-2 Project, documentation and metadata.

(1.12) Security_Information:

Not applicable, as there are no access, use or handling restrictions imposed on the data set because of National Security, privacy, or other concerns appropriate to limit the data set's access or use, or to define in this portion of the metadata.

(1.13) Native_Data_Set_Environment:

The final data set was developed on and is compatible with (a.) IBM-format compatible computers; (b.) the Microsoft Windows XP Professional OS and Microsoft Windows 2000 OS for servers; (c.) database management software Microsoft Access 2003, build 11.8321.8341, service pack 3 and Microsoft Access 2010 version 14.0.6123.5001; (d.) geographic information system software ESRI ArcGIS9.3.1 service pack 2b and ESRI ArcGIS10.1.0.3035. Documentation was generated using Microsoft Word 2003, build 11.8348.8341, service pack 3, and the documentation was converted to be compatible with Adobe PDF format. Any other provided files with the compiled data set are compatible with plain ASCII text viewer formats or internet browser formats (i.e. txt, HTML, JPG image formats). Note that Adobe Reader for Adobe PDF files is a freeware tool at the time of this documentation and is downloadable off the company web site at <http://www.adobe.com>.

Original BBA1 processing was started on Microsoft Windows 98 with subsequent revisions done on newer Microsoft operating systems. Original BBA2 processing started on Microsoft Windows NT Version 4.0 (Build 1381) Service Pack 6; however the final combination data set was completed on Microsoft Windows XP Professional and Microsoft Windows 2000 for servers.

Original geographic information system work for BBA1 started using ESRI ArcInfo and ArcGIS software version 8.1, build 8.1.0.415, and was kept compatible with version changes in that software up through ESRI ArcGIS9.3.1 service pack 2b and ESRI ArcGIS10.1. Note that ESRI does provide the freeware software tools ESRI ArcGIS Online and ESRI ArcGIS Explorer at the time of this documentation, and are downloadable off the company web site at <http://www.esri.com>.

(1.14) Cross_Reference:

In addition to those data sets cited as sources, etc. the following references or other data sets may be relevant or of interest to users of these data. However, read all documentation, metadata and other information provided by the developer(s) of these resources before using these.

Users of these data might be interested in various landuse/landcover, land type association (LTA) data, political boundaries, Michigan public land survey system (PLSS) data, aerial or imagery resources, in addition to base data (roads, hydrology, etc.), which are all provided on the internet site for the Michigan Geographic Data Library at <http://www.mcgi.state.mi.us/mgdl/> .

American Ornithologists' Union, Checklist of North American Birds at <http://www.aou.org/checklist/north/full.php> .

United States Geological Survey, North American Breeding Bird Survey at <https://www.pwrc.usgs.gov/bbs/> .

Partners In Flight, Bird Conservation Regions at <http://www.partnersinflight.org/mapscontacts.cfm> .

Ducks Unlimited, Conservation And Recreation Lands (CARL) data layer at <http://www.ducks.org/conservation/qlaro/carl-gis-layer> .

List of species Alpha Codes at <http://www.birdpop.org/pages/birdSpeciesCodes.php> .

Publication of BBA1 Atlas book:

Brewer, R., G.A. McPeck, and R.J. Adams, Jr. 1991. The Atlas of Breeding Birds of Michigan. Michigan State University Press. East Lansing, Michigan, USA. Available online at <http://www.mibirdatlas.org> .

Publication of BBA2 Atlas book:

Chartier, A.T., J.J.Baldy, and J.M.Brenneman. 2011. The Second Michigan Breeding Bird Atlas, 2002-2008. Kalamazoo Nature Center. Kalamazoo, Michigan, USA. Available online at <http://www.mibirdatlas.org> .

Section 2: Data Quality Information

(2.) Data_Quality_Information:

(2.1) Attribute_Accuracy:

(2.1.1) Attribute_Accuracy_Report:

These data are intended for either tabular use or geographic display and analysis at the township block level (6 miles by 6 miles, on average), county and State level, and should be compatible and consistent with 1:24,000 scale digital GIS datasets. Tabular data comments, notices, warnings, etc. abound and are covered in other sections of these metadata. These data are a combination of multi-generational projects for BBA1 and BBA2, done with slightly different methodology details for the collected observational data (see the rest of these metadata comments for additional relevant details). No responsibility is assumed by the MDNR in the use of these data.

Deductive estimates based on experience with these data, professional expertise and more suggest these data are reasonably useful at the scale described above and understanding the spatial scale of collected data, or reasonably useful for the tabular summarizations of similar levels above the atlas block level, and while taking all user notices, warnings and caveats into consideration. Functionally, this means those data should be used at levels larger than the atlas block, which is a quarter township/tier-and-range block of 6 miles by 6 miles on average, or approximately 3 miles by 3 miles or 4.83 kilometers by 4.83 kilometers (meters by meters), or equivalent of 5,760 acres or 2,331 hectares; using these data below those scales or spatial levels is illogical because the minimum map unit for collected information is the atlas block.

When using the attribute information within a spatial representation, or the atlas block data within GIS with the provided sampling block layers, accuracy considerations must include both the attribute and scalar accuracies. This means the geographic placement of the block boundaries may be relevant (see Section 2.4 Position Accuracy, for more details) and this should be 1:24,000 scale compliant as based mostly on USGS base data. Some types of observational data tied the the sampling block may also overlap into another block (i.e. a heard songbird song could be at or over the line if observer is near the edge of the atlas block), which is expected possibilities with this type of observational data. Bottom-line: user beware and carefully think through the desired use of these data.

(2.1.2) Quantitative_Attribute_Accuracy_Assessment:

(2.1.2.1) Attribute_Accuracy_Value: unknown

(2.1.2.2) Attribute_Accuracy_Explanation: No specific and exhaustive quantitative tests were done on all tabular data for tests of valid values, general tests for tabular data, general tests for geographic data, specific topological tests, or other rigorous testing for quality check and assurance measures.

(2.2) Logical_Consistency_Report:

These data are intended for either tabular use or geographic display and analysis at the township block level (6 miles by 6 miles, on average), county and state level, and should be compatible and consistent with 1:24,000 scale digital GIS datasets. Tabular data comments, notices, warnings, etc. abound and are covered in other sections of these metadata. These data are a combination of multi-generational projects for BBA1 and BBA2, done with slightly different methodology details for the collected observational

data (see the rest of these metadata comments for additional relevant details). No responsibility is assumed by the MDNR in the use of these data.

Several informal tests, check queries, and review steps were done on various parts of these data; however no specific and exhaustive quantitative tests were done on all tabular data for, general tests for tabular data, general tests for geographic data, specific topological tests, or other rigorous testing for quality check and assurance measures.

Data type consistency in the Breeding Bird Atlas database is enforced using MS Access defined field data types. These definitions minimize the possibility of data of an incorrect data type being stored in a field. Relational consistency within the database is enforced by native Microsoft (MS) Access functionality in defining and maintaining relationships between database tables. Systematic testing of source datasets was performed (Table 10) to remove invalid code list values from tables and identify records which violated relational integrity. See the software company information provided by Microsoft for Windows Office 2003 Access software for specific details on how MS Access enforces data type and database structure for those data stored in MS Access.

Throughout data consistency testing, data set validation, and during the data collection phase of the BBA2 project, a number of potentially problematic data set issues were identified that should be considered by any user of this product.

- a. Records in the data set from the BBA1 project represent a summary of all observations submitted for a survey block. Records in the data set from the BBA2 project represent a summary of all observations submitted on a survey form. This may result in multiple observations for a species in a survey block in the BBA2 project while this cannot occur in the BBA1 project. Similarly, direct comparisons of observations submitted for BBA1 and BBA2 cannot be made using only this electronic data set.
- b. While observation dates were requested on survey forms for BBA1, this information was not included in the fields tracked in the BBA1 data set.
- c. No survey effort data was collected during the BBA1 project.
- d. For BBA2, the number of birds recorded in a record may not correspond to the observation date or breeding behavior documented. Observers were instructed to record the highest number of birds observed for each species in each block and to record the date and breeding code of the highest level of breeding behavior observed. When multiple observations of the same species in a survey block were submitted to KNC, KNC staff used this algorithm to summarize observations on the survey form before entering them in the database.
- e. Recorded observation dates for BBA2 are biased based on dates that volunteers selected to survey (i.e. few volunteers elected to conduct surveys either early or late in the breeding season) and by the use of species checklist forms for which the data collection protocols favor the collection of a single observation date which is later in the breeding season.
- f. All values in the NumberObserved_int field in the TABLE#BirdObservations table should be treated as suspect. Regular data entry errors were found in this field during verification, and multiple volunteer observers expressed confusion as to how to calculate this value during the data collection period. Some data entry errors were obvious attempts to correct submitted data where values were recorded

- incorrectly (e.g., number of individual birds vs. number of family groups), though this was not universally the case.
- g. All values in the HoursSurveyed_single field in the TABLE#SurveyForms table should be treated as suspect. Regular data entry errors were found in this field during verification: values in the database when there was no value on the survey form, and values in the database that differed from the values on survey forms. Additionally, some survey forms were submitted with partial documentation of effort that did not account for all of the observations submitted.
 - h. Data collection was heavily skewed toward southwest Michigan, with Kalamazoo County reporting the single highest number of submitted bird observations for BBA2. There was a similar pattern in data submission for BBA1, but this can't be comparably quantified based on the existing data set. For BBA2, the distribution of submitted observations was as follows:
 - i. Southern Lower Peninsula (total): 55% of data set, composed of:
 - Kalamazoo County: 12% of data set
 - Counties surrounding Kalamazoo (Cass, Van Buren, Allegan, Barry, Calhoun, Branch, and St. Joseph): 15.1% of data set
 - The rest of the southern Lower Peninsula: 27.9% of data set
 - Northern Lower Peninsula: 23.6% of data set
 - Upper Peninsula: 21.4% of data set
 - j. The data collection periods of the two projects are not consistent. Data collection for BBA1 occurred over 6 years; data collection for BBA2 occurred over 8 years. The longer data collection period for BBA2 was necessitated by a lack of data collection by volunteers or KNC staff in the northern 2/3 of the state during the first 6 years of the data collection period.
 - k. Changes were made to the list of accepted breeding codes between BBA1 and BBA2. Specifically, the M, S, AY, FY, and FS codes do not have direct correlates.
 - l. The point count survey protocol for BBA2 was changed midway through the project. Fewer points were required in each survey block, and each point count was shorter in duration (5 minutes vs. 10 minutes). Specific locations of point counts conducted was not tracked in the database, and no notation was made as to which count protocol was used. Any calculation of effort or relative abundance from these point count data should account for this uncertainty in the data collection protocol.
 - m. There is not a direct hierarchical relationship between counties, townships, and blocks (i.e., some townships are in more than one county, and some blocks are in more than one county). In the case of townships that cross county lines, each block in the township is assigned to the county in which it lies, resulting in a township with multiple county values. This can create inconsistent results when generating queries that summarize data by county and by township if the results are compared directly. Similarly, there are a number of blocks which cross county lines, generally in areas where county lines follow features on the landscape (e.g., river courses) rather than PLSS boundaries. In these cases, the blocks in question were designated to lie in the county which contained the majority of the area of the block.

- n. Six Atlas Block ID codes were found to belong to polygons which were split and appropriately exist as two polygons but which share one unique ID code; these are 42N36W4, 41N33W1, 47N47W2, 47N47W3, 47N48W1, 48N48W3. These blocks are all found along the Michigan/Wisconsin state line where the boundary follows the course of the Menominee River.

(2.3) Completeness_Report:

These data are intended for either tabular use or geographic display and analysis at the township block level (6 miles by 6 miles, on average), county and state level, and should be compatible and consistent with 1:24,000 scale digital GIS datasets. Tabular data comments, notices, warnings, etc. abound and are covered in other sections of these metadata. These data are a combination of multi-generational projects for BBA1 and BBA2, done with slightly different methodology details for the collected observational data (see the rest of these metadata comments for additional relevant details). No responsibility is assumed by the MDNR in the use of these data.

BBA1 source data set:

The sampling system designated priority quarter-township blocks by location: statewide, one quarter-township block was designated priority in each township in the Upper Peninsula, two quarter-township blocks were designated priority in each township in the Northern Lower Peninsula, and all four quarter-township blocks were designated priority in each township in the Southern Lower Peninsula. The Kalamazoo Nature Center's survey protocol considered sampling in a survey block complete (i.e., attaining a minimum threshold for surveying) when 50 unique species had been documented, at any level, in that survey block. Each block designated as a priority block needed to be surveyed completely to ensure adequate statewide data collection. Of 4,300 priority blocks, 2,692 (62.6%) recorded at least 50 species.

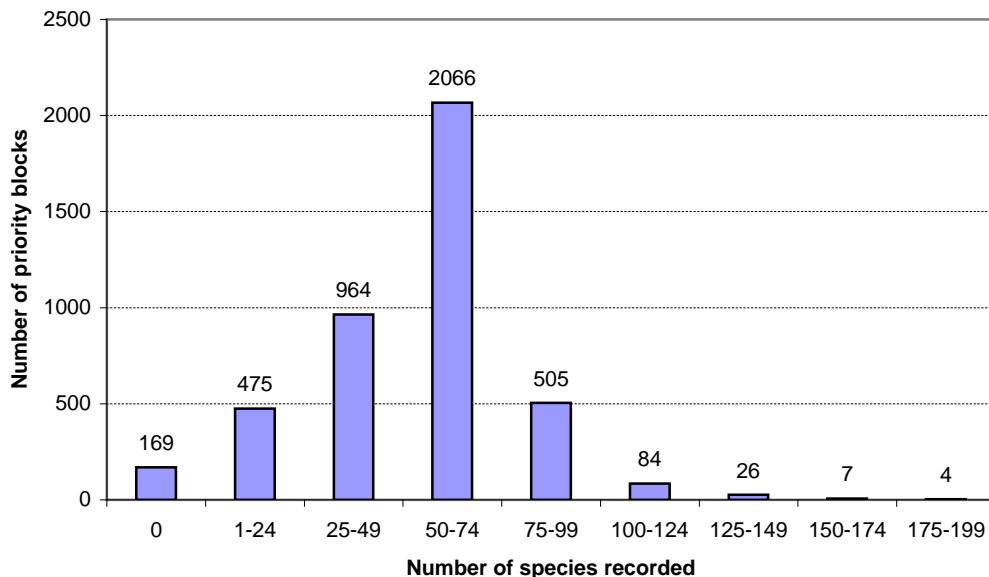


Figure 2. Number of species documented in priority blocks for BBA1.

BBA2 source data set:

The sampling system designated priority quarter-township blocks by location: statewide, one quarter-township block was designated priority in each township. The Kalamazoo Nature Center’s survey protocol considered sampling in a survey block complete (i.e., attaining a minimum threshold for surveying) when 50 unique species had been documented, at any level, in that survey block. Each block designated as a priority block needed to be surveyed completely to ensure adequate statewide data collection. Of 1,733 priority blocks, 1,465 (84.5%) recorded at least 50 species.

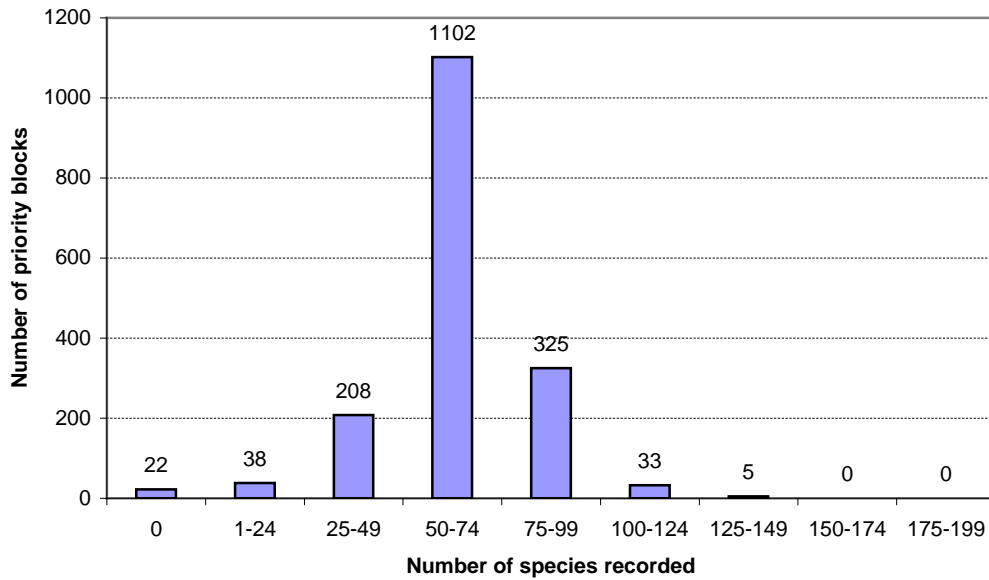


Figure 3. Number of species documented in priority blocks for BBA2.

Michigan Breeding Bird Atlas “Combination BBA1 and BBA2” data set:

The MDNR compared source data forms with the values recorded in the database for a subset of the BBA2 dataset to verify completeness and correctness in data transcription.

Of 34,842 survey forms entered in the BBA2 dataset, 2,383 survey forms were processed to compare source data to dataset values.

Original dataset size (provided by KNC after initial MDNR quality control): 503,346 observations

Number of records verified (includes records with errors): 44,444 observations

Number of records found with errors: 1,821 observations

Number of records added (present on survey form but not in dataset): 788 observation

Final dataset size (after initial MDNR quality control processing): 504,134 observations

A database structure was designed that would be capable of containing all data in the BBA1 and BBA2 data sets, retain all relevant fields and records from the source data sets, and more fully comply with the design requirements of third normal form (3NF). The specific requirements of 3NF state that every field in a table must provide information distinct from all other fields in that table and that all fields in the table must describe the key field, and only the key field (see http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/index.jsp?topic=%2Fcom.ibm.db2.z10.doc.intro%2Fsrc%2Ftpc%2Fdb2z_thirdnormalform.htm or

<http://www.bkent.net/Doc/simple5.htm> for an overview of the specifications of 3NF). The database for the Breeding Bird Atlas data set contains one violation of 3NF: the storage of town/range values in the survey block table. To fully comply with 3NF, the database should contain a separate table to contain data for each township, the key value of which would be included as a foreign key in TABLE#SurveyBlocks. The decision was made not to implement this component in order to reduce database complexity and to allow for more accurate representation of survey blocks and townships within counties when townships cross county lines. These cross-jurisdictional survey boundaries cannot be fully and correctly documented with any ease in a 3NF design.

For the geographic (GIS) data component:

The geographic location component in the tabular data will connect or allow joined table connection to the GIS polygon layer by using the town-range-block identifier. By itself, the GIS layer carries no observational data and has no real utility other than representing the Breeding Bird Atlas block locations and component values (i.e. the PLSS township and range identifier, block ID value, etc).

Town and range value fields were retained in the GIS data layer to allow for ease of aggregation of blocks in geographic analysis when necessary to balance data gaps or skewed data collection patterns; similarly, a field identifying the County which makes up the majority of the block (for both the MDNR Breeding Bird Atlas Blocks and the projected Town-Range blocks GIS layers) allows a non-duplicated representation of County membership of specific blocks. These two field identifications allow the data at the BBA Block level to be more easily aggregated up to a larger scale representation, and either allow these data to work with other larger scale data or allow some scalar and aggregate grouping which can correct for data concerns at the BBA Block level.

The created BBA Block layer covering all of Michigan (discussed in detail in Section 2.5.2.d.; sample of coverage shown in Figure 1), combined with the tabular data in the Access database (discussed in Section 2.5.2.c), should facilitate a one-to-many match of the GIS layer polygons to the tabular data in the Access database. However, six Atlas Block ID codes were found to belong to polygons which were split and appropriately exist as two polygons but have one unique ID code. Using data values for attribute field "Town_Range", these are: T42NR36W4; T41NR33W1; T47NR47W2; T47NR47W3; T47NR48W1; and T48NR48W3.

Contents of BBA Atlas Blocks layer are 11,199 Atlas Blocks, composed of (a.) 2,799 of blockcode = 1; (b.) 2,801 of blockcode = 2; (c.) 2,796 of blockcode = 3; and (d.) 2,803 of blockcode = 4; from 2,890 official and projected town-range blocks across the State of Michigan.

Anyone unfamiliar with setting up a connection between a tabular data file and a matching unique value in a field in a GIS layer, should consult ESRI's help and documentation materials for the command "Join" or "Relate". This Atlas Block layer is provided in the final data set, and is called "MichiganDNR_Breeding_Bird_Atlas_blocks_polygons ..." (available as both an ArcGIS Personal GeoDatabase layer and an ESRI Shapefile).

Figure 4 shows the origination information for the BBA Blocks and includes a qualified (not quantified) estimate of data developer confidence in the BBA Block locations and overall quality. The field "BBAAtlas_Block_Source" has these feature-specific details included for every BBA Block, allowing end users to investigate the block quality comments per block, if needed.

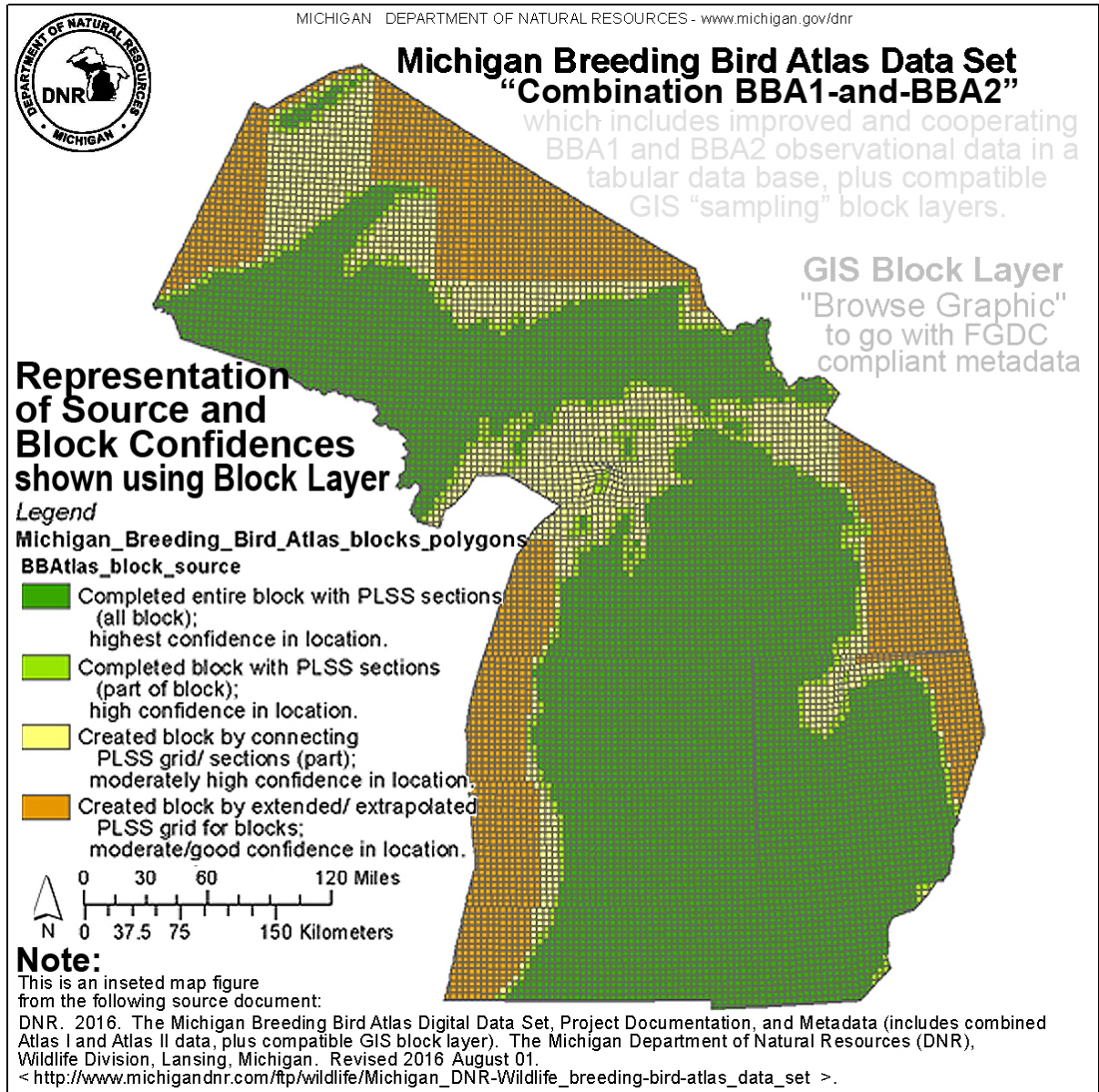


Figure 4. Representation of sources and block confidences for GIS layer

Because of some of the known issues with data collection, it may be prudent to use a more conservative grid framework for analysis of BBA data. This would move data issues from a finer scale to a more coarse representation at a new larger polygon, such as at a Town-Range scale (6 mile by 6 mile) or even at the county level. A new larger polygon layer representing town-range block (TR blocks; shown in Figure 4) was created, with the town-range scale grid spread across the entire State of Michigan; data checks were done on this layer. This new product data layer is provided in the final data set, and is called “MichiganDNR_Breeding_Bird_Atlas_projected_TR_blocks_polygons ...” (available as both an ArcGIS Personal Database layer and an ESRI Shapefile)

Carefully note the distinction between “BBA Blocks” or Atlas Blocks and “Town-Range blocks” or TR blocks; these are two differing scalar grid systems. “BBA Blocks” are the 3 mile by 3 mile (approximate, with some notable variation both larger and smaller)

square-ish polygons designating a grid system for data storage of BBA observational entries, stored in the Access tabular database. “Town-Range blocks” are the 6 mile by 6 mile (approximate) square-ish polygons based on PLSS town and range designations. Every effort has been made in this document, metadata and the companion data to specify either Atlas Block, town-range block, or tr-block.

End-users can aggregate data to the county level by using prepared data fields in either the Access data or the GIS data. The GIS data layers for both the BBA Block layer (as shown in Figures 1 and 3) and the TR block layer (as shown in Figure 4) include a county field which identifies each block to its appropriate membership to a single county, determined by the majority of area in situations where more than one county may be included within a single block.

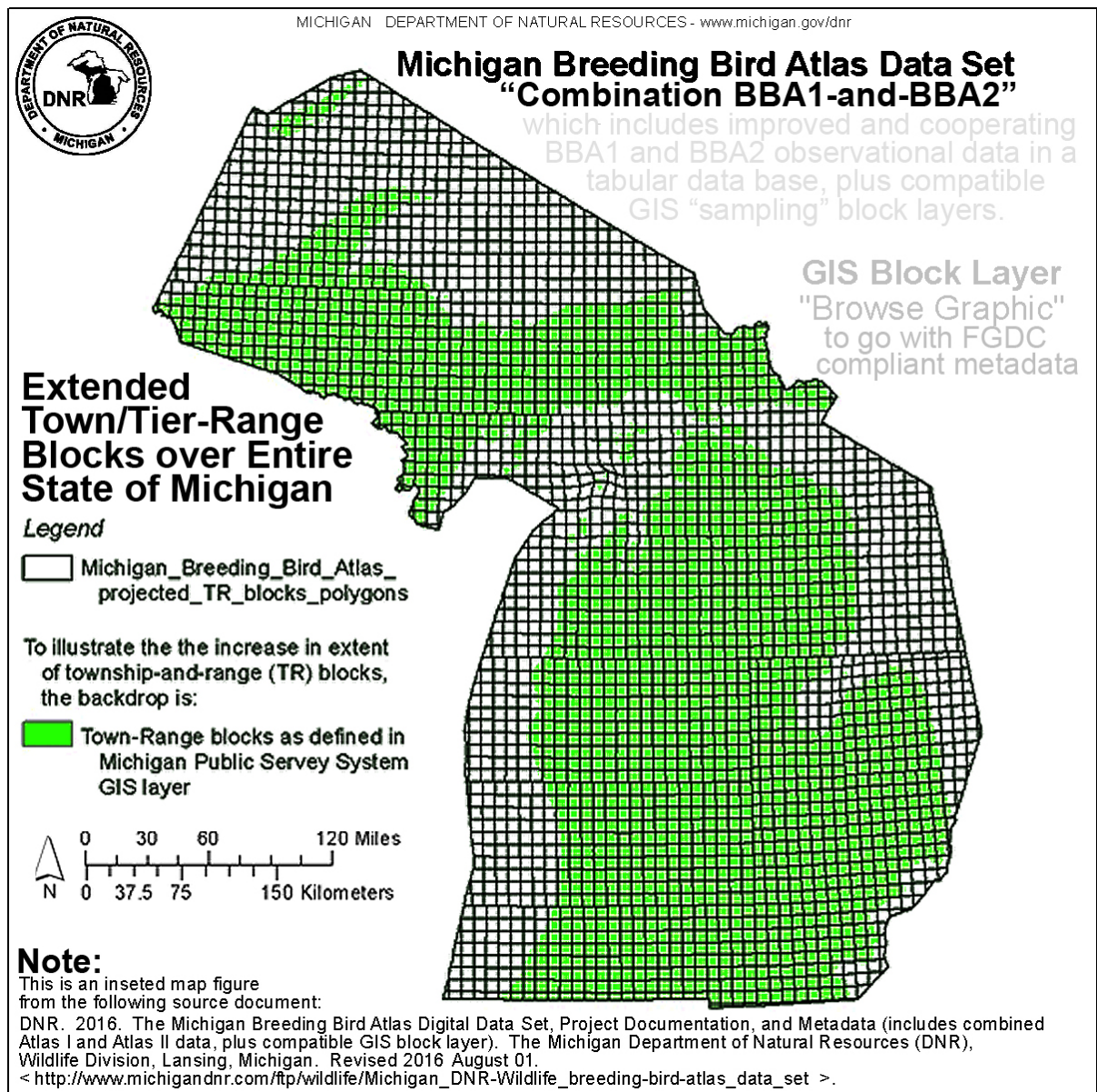


Figure 5. Representation of projected town-range divisions GIS layer

(2.4.) Positional_Accuracy:

(2.4.1) Horizontal_Positional_Accuracy:

(2.4.1.1) Horizontal_Positional_Accuracy_Report: Horizontal positional accuracy is based on the accuracy of the digital Public Land Survey System (township/range) 1:24,000 coverage.

(2.4.1.2) Quantitative_Horizontal_Positional_Accuracy_Assessment:

(2.4.1.2.1) Horizontal_Positional_Accuracy_Value: plus or minus 109.7 meters (360 feet)

(2.4.1.2.2) Horizontal_Positional_Accuracy_Explanation:

The horizontal position accuracy value estimate for this project was calculated using National Mapping Accuracy Standards (NMAS) and compliance statement information for geospatial data used within this project, with the FGDC guidelines for calculating accuracy based on NMAS; using 1:24,000 scale data this results in a positional accuracy estimate of within +/-21.95 meters (72 feet). However, due to concerns of overrepresenting the positional accuracies of these data it is recommended to handle these as 1:100,000 scale data, which results in a calculated estimate of positional accuracy of within +/-109.7 meters (360 feet). This revision is due to the nature of the observational data collected on the ground by volunteers which is of untested scale and may contain minor positional errors.

Deductive estimates based on experience with these data, professional expertise and more suggest these data are reasonably useful at the scale described above and understanding the spatial scale of collected data, or reasonably useful for the tabular summarizations of similar levels above the atlas block level, and while taking all user notices, warnings and caveats into consideration. Functionally, this means those data should be used at levels larger than the atlas block, which is a quarter township/tier-and-range block of 6 miles by 6 miles on average, or approximately 3 miles by 3 miles or 4.83 kilometers by 4.83 kilometers (meters by meters), or equivalent of 5,760 acres or 2,331 hectares; using these data below those scales or spatial levels is illogical because the minimum map unit for collected information is the atlas block.

Portions stated earlier in Section 2.1.1, on Attribute Accuracy explanation, relate to the discussion of positional accuracies too.

When using the attribute information within a spatial representation, or the atlas block data within GIS with the provided sampling block layers, accuracy considerations must include both the attribute and scalar accuracies. This means the geographic placement of the block boundaries may be relevant (see Section 2.4 Position Accuracy, for more details) and this should be 1:24,000 scale compliant as based mostly on USGS base data. Some types of observational data tied to the sampling block may also overlap into another block (i.e. a heard songbird song could be at or over the line if observer is near the edge of the atlas block), which is expected possibilities with this type of observational data. Bottom-line: user beware and carefully think through the desired use of these data.

(2.4.2) Vertical_Positional_Accuracy:

(2.4.2.1) Vertical_Positional_Accuracy_Report: Vertical accuracy was not tested, as vertical location is not a component of these data in this data set, and not applicable.

- (2.4.2.2) Quantitative_Vertical_Positional_Accuracy_Assessment:
 - (2.4.2.2.1) Vertical_Positional_Accuracy_Value: (not applicable).
 - (2.4.2.2.2) Vertical_Positional_Accuracy_Explanation: (not applicable).
- (2.5) Lineage:
 - (2.5.1) Source_Information:

For this project data set, there are several major components; each discussed as its own process step, but referenced here as source information. These include:

 - (a.) Michigan Breeding Bird Atlas 1 data (KNC BBA1, really from KNC/DNR/MNFI);
 - (b.) Michigan Breeding Bird Atlas 2 data (KNC BBA2);
 - (c.) Michigan Breeding Bird Atlas data set (combined BBA1 and BBA2 data sets with additional data review, correction and processing); and
 - (d.) MDNR Wildlife Division GIS layer for BBA blocks.
 - (2.5.1.1.a) Source_Citation:

Citation_Information: Michigan Breeding Bird Atlas 1 source data set:

 - (2.5.1.1.a.1) Originator: Kalamazoo Nature Center under contract to Michigan Department of Natural Resources
 - (2.5.1.1.a.2) Publication_Date: 1991 – with data transfer of tabular data in 2000
 - (2.5.1.1.a.4) Title: The Michigan Breeding Bird Atlas
 - (2.5.1.1.a.5) Title: (first).
 - (2.5.1.1.a.6) Geospatial_Data_Presentation_Form: tabular
Other_Citation_Details: A.T. Chartier, J.J. Baldy, and J.M. Brenneman. Eds. Online at <http://www.mibirdatlas.org>. Citation and information served off the website is to cite BBA1, and not BBA2; beware as there may be portions of BBA2 data served off the website which have not been through the many detailed checks and processing work done on this set , the combination data set of the BBA-1-and-2 data set (detailed in this documented).
 - (2.5.1.2.a) Source_Scale_Denominator: 24000
 - (2.5.1.3.a) Type_of_Source_Media: paper
 - (2.5.1.4.a) Source_Time_Period_of_Content:
 - (2.5.1.4.a.1) Source_Currentness_Reference: 1999; deliverable date of digital version of the contract data set and products.
 - (2.5.1.4.a.2) Source_Currentness_Explanation: The actual currentness is ground condition dates of field observations in 1983-1988.
 - (2.5.1.5.a) Source_Citation_Abbreviation: KNC BBA1 product**
 - (2.5.1.6.a) Source_Contribution:

Tabular database of information on tier, range, block, species, year observed and rank of breeding status, where a block was defined as a quarter-township unit. Read Section 2.5.2.a. for more details.
 - (2.5.1.1.b) Source_Citation:

Citation_Information: Michigan Breeding Bird Atlas 2 source (raw) data set:

 - (2.5.1.1.b.1) Originator: Kalamazoo Nature Center under contract to Michigan Department of Natural Resources
 - (2.5.1.1.b.2) Publication_Date: 2011
 - (2.5.1.1.b.4) Title: The Second Michigan Breeding Bird Atlas
 - (2.5.1.1.b.5) Title: second
 - (2.5.1.1.b.6) Geospatial_Data_Presentation_Form: tabular
Other_Citation_Details: A.T. Chartier, J.J. Baldy, and J.M. Brenneman. Eds. Online at <http://www.mibirdatlas.org>
 - (2.5.1.2.b) Source_Scale_Denominator: 24000

- (2.5.1.3.b) Type_of_Source_Media: paper
- (2.5.1.4.b) Source_Time_Period_of_Content:
 - (2.5.1.4.b.1) Source_Currentness_Reference: 2009; deliverable date of digital version of the contract data set and products
 - (2.5.1.4.b.2) Source_Currentness_Explanation: The actual currentness is ground condition dates of field observations in 2001-2008.
- (2.5.1.5.b) Source_Citation_Abbreviation: **KNC BBA2 product**
- (2.5.1.6.b) Source_Contribution: Tabular database of information on tier, range, block, species, year observed and rank of breeding status, where a block was defined as a quarter-township unit and supplementary hard copy observation forms containing data not included in the digital data set. Read Section 2.5.2.b. for more details.
- (2.5.1.1.c) Source_Citation: Citation_Information: Michigan Breeding Bird Atlas (“combination” Atlas 1 and 2) data set:**
 - (2.5.1.1.c.1) Originator: State of Michigan, Department of Natural Resources, Wildlife Division
 - (2.5.1.1.c.2) Publication_Date: 2016 August 01
 - (2.5.1.1.c.4) Title: MDNR Wildlife Division Combo-BBA1-2 Project data set in Microsoft Access relational data base tables
 - (2.5.1.1.c.6) Geospatial_Data_Presentation_Form: polygons
- (2.5.1.2.c) Source_Scale_Denominator: 24000
- (2.5.1.3.c) Type_of_Source_Media: digital
- (2.5.1.4.c) Source_Time_Period_of_Content:
 - (2.5.1.4.c.1) Source_Currentness_Reference: 2012
 - (2.5.1.4.c.2) Source_Currentness_Explanation: The actual currentness is ground condition dates of field observations in 1983-1988 and 2001-2008, of the combined BBA1 and BBA2 data sets.
- (2.5.1.5.c) Source_Citation_Abbreviation: DNR Wildlife Division Combo-BBA1-2 Project**
- (2.5.1.6.c) Source_Contribution: Tabular database of information on tier, range, block, species, year observed and rank of breeding status, where a block was defined as a quarter-township unit.
- (2.5.1.1.d) Source_Citation:
 - Citation_Information: Michigan DNR Wildlife Division GIS layer for BBA blocks
 - (2.5.1.1.d.1) Originator: State of Michigan, Department of Natural Resources, Wildlife Division
 - (2.5.1.1.d.2) Publication_Date: 2011
 - (2.5.1.1.d.4) Title: Michigan DNR Wildlife Division GIS layer for BBA blocks , a resampling of the Michigan’s Public Land Survey System (PLSS) polygon layer
 - (2.5.1.1.d.6) Geospatial_Data_Presentation_Form: polygons
 - Other_Citation_Details:
 - The citation for the PLSS polygon layer is:
 - Citation_Information: Michigan PLSS Sections GIS layer:
 - (2.5.1.1.d.6.1.1) Originator: State of Michigan, Department of Technology, Management and Budget
 - (2.5.1.1.d.6.1.2) Publication_Date: 2011
 - (2.5.1.1.d.6.1.4) Title:
 - Michigan’s Public Land Survey System (PLSS) polygon layer
 - (2.5.1.1.d.6.1.6) Geospatial_Data_Presentation_Form: polygons
 - Other_Citation_Details:

PLSS sections are online at

<http://www.mcgi.state.mi.us/mgdl/?rel=thext&action=thmname&cid=10&cat=Public+Land+Survey+Sections>.

Citation is: MGD. 2012. Michigan Geographic Data Library (MGDL; serving Michigan geographic information system data resources to public). State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online < <http://www.mcgi.state.mi.us/mgdl>>. Accessed 11 October 2014.

The Michigan PLSS is a specific set of information about the PLSS irregular grid system for the State of Michigan, and:

(i.) the Michigan geospatial data comes from the source:

MGDL. 2012. Michigan Geographic Data Library (MGDL; serving Michigan geographic information system data resources to public). State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online < <http://www.mcgi.state.mi.us/mgdl>>. Accessed 11 October 2014.

(ii.) the PLSS is structured according to the standards and practices from the following citation:

BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System (PLSS) manual). Bureau of Land Management (BLM; 1946 to present) and Government Land Office (GLO; 1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801; facsimile 1-202-208-5242; e-mail questions@blm.gov; online at < <http://www.blm.gov> >. Publication is available online at < <http://www.blmsurveymanual.org/index.html> >; hardcopy available from the U.S. Government Printing Office online at < <http://www.gpo.gov> >. Accessed 20 November 2012.

(2.5.1.1.d.6.2) Source_Scale_Denominator: 24000

(2.5.1.1.d.6.3) Type_of_Source_Media: digital

(2.5.1.1.d.6.4) Source_Time_Period_of_Content:

(2.5.1.1.d.6.4.1) Source_Currentness_Reference: 2011; download date of GIS layer served online

(2.5.1.1.d.6.4.2) Source_Currentness_Explanation: This is the best PLSS information available for the State of Michigan.

(2.5.1.1.d.6.5) Source_Citation_Abbreviation: Michigan PLSS

(2.5.1.1.d.6.6) Source_Contribution: GIS layer of Michigan's town-range-section land ownership representation based on US. Public Land Survey System (PLSS) irregular grid reference system, as polygons. Read Section 2.5.2.d. for more details.

(2.5.1.2) Source_Scale_Denominator: 24000

(2.5.1.3) Type_of_Source_Media: digital

(2.5.1.4) Source_Time_Period_of_Content:

(2.5.1.4.1) Source_Currentness_Reference: 2011; download data of GIS layer served online

(2.5.1.4.2) Source_Currentness_Explanation: This is the best BBA-1-and-2 polygons based on the best PLSS information available for the State of Michigan.

(2.5.1.5) Source_Citation_Abbreviation: MDNR Wildlife Division GIS layer for BBA blocks

(2.5.1.6) Source_Contribution: a geospatial framework for the sample blocks over the State of Michigan.

(2.5.2) Process_Step:

For this project data set, there are four major components; these are each discussed as it's own process step:

- (a.) Michigan Breeding Bird Atlas 1 data (BBA1);
- (b.) Michigan Breeding Bird Atlas 2 data (BBA2);
- (c.) Michigan Breeding Bird Atlas data set (combined BBA1 and BBA2); and
- (d.) MDNR Wildlife Division GIS layer for BBA blocks.

(2.5.2.a.) Process_Step: 1 (or "a")

(2.5.2.a.1) Process_Description: Michigan Breeding Bird Atlas 1 source data set. Processing steps and methodology done on the BBA1 data collection project are as follows:

The purpose of this process step was to collect and digitally record breeding bird observation data for the state of Michigan during 1983-1988. Digital data files were structured such that the minimum necessary data was stored so that maps could be generated which displayed the highest recorded breeding behavior level for each survey block. Most ancillary collected data (e.g., multiple observations of a single species in a survey block, observation date, etc.) were not included in the data set if they were not necessary for map generation.

BBA1 Overview:

The BBA1 project was undertaken in the 1980s by the Michigan Department of Natural Resources (DNR) and Kalamazoo Nature Center (KNC). Project management and coordination was performed by KNC. The sampling framework implemented, in general, 9 square mile survey blocks based on the Public Land Survey System (see BBA2 methodology below and The Atlas of Breeding Birds of Michigan - <http://www.mibirdatlas.org/MBBA1.aspx> - for additional details of the sampling framework).

Breeding codes were based on the North American Ornithological Atlas Committee (NORAC) standard with modifications: the presence of multiple singing males is not recognized in the NORAC standard as an indicator of probable breeding; carrying nesting material is recognized as a distinct indicator of confirmed breeding in the NORAC standard and is differentiated from the nest building breeding code; the presence of flightless precocial young is recognized as a distinct code in the NORAC standard but is combined with the FL code in BBA1; and the BBA1 code AY combines the three distinct NORAC standard codes of 1) carrying food, 2) adult feeding recently fledged young, and 3) adult carrying fecal sac. See <http://www.bsc-eoc.org/norac/index.jsp?targetpg=atlascodes> for the full NORAC standard code list.

Data collection was conducted during 1983-1988 and was heavily dependent on survey efforts of volunteers. Volunteers submitted data either on block checklists or casual observation cards formatted similarly to the forms used in BBA2 (see below). Collected data was supplemented by datasets from other ongoing survey and research projects including the North American Breeding Bird Survey and MDNR gamebird surveys.

Table 2. Breeding codes used in BBA1.

Breeding category	Breeding code	Description
OBSERVED	O	Species (male or female) observed during the breeding season, but believed not to be breeding in the block.
POSSIBLE	/ (V)	Species (male or female) observed in suitable nesting habitat during its breeding season.
POSSIBLE	X	Singing male present in suitable nesting habitat during its breeding season.
PROBABLE	M	Seven or more singing males present in suitable nesting habitat during their breeding season.
PROBABLE	P	Pair observed in suitable nesting habitat during its breeding season.
PROBABLE	T	Permanent territory presumed through defense (e.g., chasing other birds, or song at the same location on at least two occasions a week or more apart).
PROBABLE	C	Courtship behavior or copulation.
PROBABLE	N	Visiting probable nest-site.
PROBABLE	A	Agitated behavior or anxiety calls from adult.
PROBABLE	B	Nest building by wrens or excavation of holes by woodpeckers.
CONFIRMED	NB	Nest building by all except woodpeckers and wrens.
CONFIRMED	PE	Physiological evidence of breeding (e.g., highly vascularized, edematous incubation [brood] patch or egg in oviduct) based on bird in hand.
CONFIRMED	DD	Distraction display or injury feigning.
CONFIRMED	UN	Used nests or eggshells found. (These must be carefully identified if they are to be accepted).
CONFIRMED	FL	Recently fledged young (of altricial species) incapable of sustained flight or downy young (of precocial species) restricted to the natal area by dependence on adults or limited mobility.
CONFIRMED	ON	Occupied nest: adults entering or leaving a nest site in circumstances indicating occupied nest (includes high nests or nest holes, the contents of which cannot be seen) or adult incubating or brooding.
CONFIRMED	AY	Attending young: adult carrying fecal sac or food for young, or feeding recently fledged young.
CONFIRMED	NE	Nest with egg(s).
CONFIRMED	NY	Nest with young seen or heard.

Data was stored in a FileMaker Pro database and reviewed to identify and correct errors. The final dataset provided by KNC to the MDNR included only a single entry for any species in a survey block. This entry indicated the highest level of breeding confirmation documented for the species in the block and the year in which the observation was made. This dataset did not include observation date, number observed, or a measure of effort. Specific details

regarding survey design, data collection, and data quality control can be found in Chapter 1 of The Atlas of Breeding Birds of Michigan (<http://www.mibirdatlas.org/MBBAI.aspx>).

The tabular database was converted to a point coverage by writing a FileMaker Pro program that selected a section number for each observation based on its block number. The center point of the section was computed and assigned as the coordinate for the block. By default, section 11 was used for block 1, section 8 for block 2, section 29 for block 3, and section 26 for block 4. If the default section was not mapped into the BBA1 survey framework (e.g., offshore sections or missing sections in PLSS correction zones), the program selected another section with the specified block. If no sections in the block were found, then (0,0) was written as the (x,y) coordinates. This occurred for 19 records that were located in the Great Lakes. Locations of (0,0) resulting from the previous step were manually moved to their correct location, as determined from the digital Public Land Survey System coverage extrapolated past the Michigan state boundary. Additional taxonomic attributes were added to describe Order, Family, Sub-family, and scientific name.

This digital data was exported as a comma-delimited file and provided to MDNR Wildlife Division in 1999-2000. Data were imported into GIS, and cursory review found several problems which were fixed by correcting geographic placements or correcting observational data for obvious problems (e.g., misspelling of common names, etc). The resulting GIS layer processed at the MDNR Wildlife Division, was sent back to KNC; the layer was also retained in-house.

- (2.5.2.a.2) Sources_Used_Citation_Abbreviation: BBA1
- (2.5.2.a.3) Process_Date: 2000-2012
- (2.5.2.a.4) Process_Time: (not applicable).
- (2.5.2.a.5) Source_Produced_Citation_Abbreviation: **BBA1**
- (2.5.2.a.6) Process_Contact:
 - (2.5.2.a.6.1) Contact_Person_Primary:
 - (2.5.2.a.6.1.1) Contact_Person: Karen Cleveland or alternate / secondary contact Marshall Strong (but recommend using the contact position and contact organization, listed below)
 - (2.5.2.a.6.1.2) Contact_Organization: State of Michigan, Department of Natural Resources, Wildlife Division
 - (2.5.2.a.6.2) Contact_Organization_Primary: State of Michigan, Department of Natural Resources, Wildlife Division
 - (2.5.2.a.6.3) Contact_Position: MDNR Wildlife Division's All Bird Biologist, or alternate / secondary contact of MDNR Wildlife Division's Mapping and Geotechnology Program Specialist
 - (2.5.2.a.6.4) Contact_Address:
 - (2.5.2.a.6.4.1) Address_Type: mailing address
 - (2.5.2.a.6.4.2) Address: P.O. Box 30444
 - (2.5.2.a.6.4.3) City: Lansing
 - (2.5.2.a.6.4.4) State_or_Province: MI
 - (2.5.2.a.6.4.5) Postal_Code (ZIP or ZIP+): 48909-7944
 - (2.5.2.a.6.4.6) Country: United States of America
 - (2.5.2.a.6.5) Contact_Voice_Telephone: 1-517-284-9453
 - (2.5.2.a.6.6) Contact_TDD/TTY_Telephone: 711 (Michigan Relay Center)

(2.5.2.a.6.7) Contact_Facsimile_Telephone: 1-517-373-9566

(2.5.2.a.6.8) Contact_Electronic_Mail_Address: DNR-Wildlife@michigan.gov ; Those interested can also see the MDNR website online at <http://www.michigan.gov/dnr> for more information.

(2.5.2.a.6.9) Hours_of_Service: recommended Universal / GMT 12noon to 8pm or United States Eastern Standard Time 8am to 5pm

(2.5.2.a.6.10) Contact_Instructions: No significant instructions, other than: (a.) Please have patience as it may take a couple of days to reply back to questions, depending on the methods used (email, etc.) to contact our organization, (b.) please refer to this data set by its proper name of “Michigan Breeding Bird Atlas data set” or other relevant details, in any message or with questions.

(2.5.2.b.) Process_Step: 2 (or “b”)

(2.5.2.b.1) Process_Description: Michigan Breeding Bird Atlas 2 source data set. The processing steps and methodology done on the BBA2 data collection project are as follows:

The purpose of this process step was to collect and digitally record breeding bird observation data for the state of Michigan during 2001-2008. Digital data files were structured such that the minimum necessary data was stored for each individual survey form received to generate maps which displayed the highest recorded breeding behavior level for each survey block. Some ancillary collected data (e.g., multiple observations of a single species on a single survey form) were not included in the data set if they were not necessary for map generation.

Overview:

The main goal of the BBA2 was, as in BBA1, to document and map the distribution of Michigan’s breeding birds. Additional goals of documenting changes in distribution and abundance that have taken place since the first atlas (1983-1988) were included.

Field work for this project took place during 2001-2008, a period of eight years. This allowed two more years than was allocated to conduct field work for BBA1 and was two more years than originally planned. Examinations of coverage during the sixth year of BBA2 revealed a lack of adequate coverage that could only be remedied by additional field work.

The methods and sampling design were selected to allow comparisons with BBA1 and are based on recommendations of the North American Ornithological Atlas Committee as published in the Handbook of Atlasing for North American Breeding Birds (<http://www.bsc-eoc.org/norac/atlascont.htm>). These recommendations have become the standard in breeding bird atlas projects and were used in part or in whole by many other atlases within the Midwest region, primarily New York, Ontario, and Ohio, but also Wisconsin, Indiana, and Illinois.

Sampling Framework:

Most of Michigan was surveyed as part of the Public Land Survey System (PLSS) into a series of parcels designated by town (6 mile units north/south of the state baseline), range (6 mile units east/west of the state meridian), and section (one square mile) identifiers. Each township is defined by a single town and range identifier and typically consists 36 one-square-mile sections. The PLSS surveys were conducted in Michigan in the early to mid-1800s by

the United States General Land Office (now handled by the United State Bureau of Land Management). Legacy properties such as lands transferred into private hands prior to the GLO surveys, which included expanses of French claims and other smaller defined properties (e.g., the Detroit River area and St. Ignace), were not included in the PLSS.

An extended Michigan PLSS data layer was created by the MDNR to include the legacy properties not contained in the formal PLSS. PLSS survey lines were extrapolated through these lands to create an extended PLSS which covered all statewide dryland areas to the Great Lakes shoreline and slightly beyond. This layer was provided to KNC to serve as the basis for a statewide sampling framework.

The PLSS system was selected for use in the first atlas, and was used in the second atlas for continuity and comparison between the two atlases. The atlas block (Figure 4) is the only spatial unit that is not inherent in the PLSS system. A block consists of a quarter township, each being comprised of nine sections in a standard square township. There were 1,927 Townships and 7,192 blocks in this system. These totals are higher than the first atlas and can be explained by the addition of several survey blocks in the Detroit River, multiple blocks along the Great Lakes shoreline, and a few blocks encompassing Great Lakes islands that were not included in the BBA1 sampling framework. This is likely a result of improved mapping technology since the end of BBA1. Partial township units, resulting in partial blocks, occur at the edges of physical boundaries and along the Michigan Meridian as well as other PLSS boundary adjustments designed to correct for the curvature of the earth.

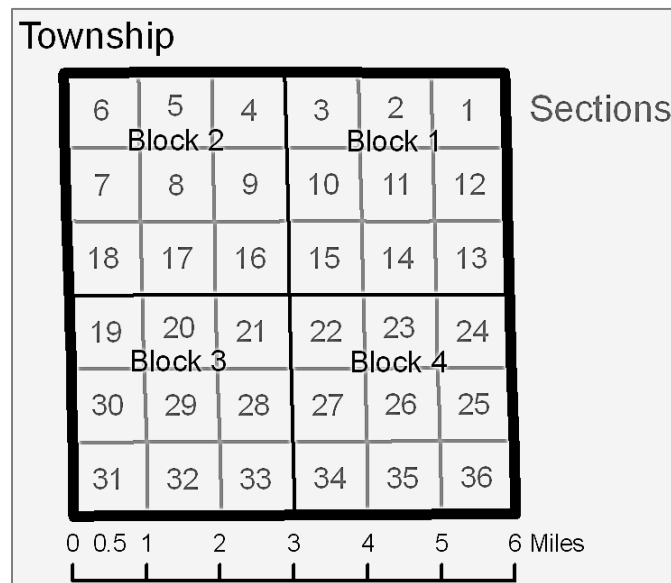


Figure 6. Structure of survey blocks within town-range blocks.

There are three reasons for using this grid system. For one it employs the familiar township-range-section designation that is used in most property ownership boundaries and is evident in county land ownership maps and road development patterns in the SLP. Secondly, this is the survey unit size recommended for atlas projects by NORAC, formerly known as the First

Northeastern Breeding Bird Atlas Conference (Laughlin et al. 1982). The third reason for using this grid system was that it provided a means to compare current results with the first atlas.

Allocation of Survey Effort:

A priority block system was designed by randomly selecting one block from each township. This system was used to identify needed allocation of survey effort to increase the likelihood of collecting a representative data set. Additionally, a single secondary block was designated for each township which consisted of at least two blocks. The survey protocol called for the project coordinator to assign observers to conduct surveys in priority blocks before assigning observers to secondary blocks, and finally to nonpriority blocks. In practice, many observers self-selected the blocks they would survey, resulting in significant sampling in secondary and nonpriority blocks and necessitating the hiring of paid observers to ensure that priority blocks were surveyed.

The selection of priority blocks for the BBA2 project differed from priority block allocation for the BBA1 project where priority blocks were randomly selected from townships at a rate of one block per township in the Upper Peninsula, two blocks per township in the Northern Lower Peninsula, and four blocks per township in the Southern Lower Peninsula. The priority blocks selected for the BBA2 project are a randomly selected subset of the priority blocks selected for the BBA1 project. Secondary blocks were randomly selected in the Upper Peninsula and Southern Lower Peninsula; in the Northern Lower Peninsula, the priority block in each township in BBA1 which was not a priority block in BBA2 was designated as the secondary block. This reduction in sampling goals was in response to the limited resources available to conduct statewide surveying and were intended to more evenly distribute sampling effort statewide to address concerns of undersampling in the Upper Peninsula from the BBA1 project. The nine counties in Southwest Michigan received disproportionate survey effort to address priorities of other concurrent projects at the Kalamazoo Nature Center and as a result of biased survey site selections by KNC staff.

Priority blocks could be demoted and an alternate block selected as that township’s priority block at KNC’s discretion; secondary blocks were given preference when selecting a new priority block. This demotion was often made by observers who were conducting atlas surveying in the originally designated priority block and who determined that there was insufficient access to fully survey the block; these observers were directed to select an alternate priority block in the township based on similarity of land cover with the original priority block. Though not quantified or tracked during the project, project staff estimate that priority blocks were changed in no more than 2% of townships.

Table 3. Distribution of recorded observations by block type and region.

Michigan Region	Source of observation records submitted			
	Priority blocks	Secondary blocks	Nonpriority blocks	Total
UP	45,341	21,802	40,527	107,670
NLP	55,784	22,591	40,745	119,120
SLP	92,448	63,673	121,223	277,344
Total	193,573	108,066	202,495	504,134

Field work was conducted from 2001 through 2008. In 2001, surveys were done in a limited capacity while organizing for the primary atlas period of 2002 through 2006. Surveying was extended to 2007 to capture early results of the 2007-2009 decadal Great Lakes Colonial Waterbird Count. Surveying was conducted in 2008 to supplement inadequately assessed areas, primarily in the NLP and UP.

Participation:

Michigan was divided into 26 regions with 2 to 4 counties per region. Each region had a regional coordinator who helped to recruit volunteers and monitor coverage. If a region did not have a coordinator, the Kalamazoo Nature Center office organized the observers for that area.

Atlas participants received a packet with the supplies and information needed to survey their assigned block(s). These packets contained the following items: map, checklist, instructions, and pertinent information about breeding birds. Newsletters, workshops provided by atlas staff, and direct communication with regional coordinators and fellow observers were the main avenues for field work coordination and distribution of information. Survey site selection was at the discretion of the individual observer in the case of volunteers, but observers were encouraged to survey priority blocks first and to visit all habitats within those blocks.

Paid field staff blockbusted designated survey blocks to cover more area in a shorter amount of time. Blockbusting consisted of intensive surveying of all land cover types in a block in a 4-5 hour period. While no minimum species count was required for blockbusting, observers who visited a block more than once were expected to assess their species list to target their efforts to document expected species which had not previously been recorded for the block in BBA2. Most field staff covered 2 to 4 blocks daily using this method.

The total number of observers who submitted data in this atlas project was at least 604 people. The exact number of observers is not known. The list of observers includes 17 groups or data collection projects (e.g. American woodcock Banding Program, Chippewa Nature Center Staff) that submitted 15,546 records without attribution of records to individual observers. Additionally, 275 observations were attributed to “John Q. Public”; these records are the result conversations between KNC staff and the public via phone, email, postal mail, or in person and may represent up to 275 different observers. The number of atlas participants was lower than the last atlas.

Table 4. Annual data collection activities during BBA2.

Survey Year	2001	2002	2003	2004	2005	2006	2007	2008
Volunteer Observers	67	148	169	168	270	306	327	155
Paid Staff Observers		7	9	5	4	12	18	8
Survey Cards/Forms	1,446	3,586	5,140	4,419	5,527	5,561	5,419	3,744
Records	19,055	41,567	53,505	60,676	73,963	83,752	106,100	65,516

Limitations and Biases:

Among the limitations and biases when conducting a statewide survey of birds are the ability of observers to correctly and completely identify species, the amount of effort expended in each survey block, the number of observers, and the distribution of effort across the project area. Summarizing data by township may mitigate some of the effects caused by observer-related differences. As in the first atlas, there was sampling bias caused by observers concentrating effort in more productive or popular birding areas and habitats and neglecting areas that were expected to yield a low species count. Industrial, agricultural, and urban areas were some examples of areas that were less likely to be adequately surveyed, while areas of forests, coastlines, parks, marshlands, and edge habitat drew more effort.

Most of the atlas field work took place from late May to mid-July and during the early morning hours. This biased the data collection against early nesting species and species that nest late in the season. Crepuscular and nocturnal birds still were underreported, even though a more concentrated effort was made during this atlas to cover these types of species.

Table 5. Seasonal distribution of BBA2 data collection.

Michigan Region	Month collected of observation records submitted												
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	No date
NLP	7	67	288	3256	17903	66549	29170	1769	92	5	16	3	1
SLP	171	361	1136	8567	43278	166191	52726	4614	180	37	11	64	2
UP	9	14	75	1096	9303	72441	22512	2148	68	1	0	1	2
Total	187	442	1499	12919	70484	305181	104408	8531	340	43	27	68	5

Data Collection:

Three basic protocols were used to conduct surveys for the Second Breeding Bird Atlas: point counts, block checklists, and casual observation submissions. Each protocol used a different data collection form, but all collected some common baseline data: observer, observation date, observation location (town/range and survey block), species, breeding code, and number observed. Additionally, the point count and block checklist protocols were designed to capture data regarding effort. Any calculation of survey effort based on these protocols is problematic for two reasons: a significant number of block checklists forms were submitted with incomplete survey effort data, and the point count protocol changed from a 10 minute to a 5 minute count midway through the data collection period, but no differentiation was made in the database to indicate the duration of the count. The number of birds recorded on all data collection forms is a count of pair equivalents (e.g. one pair = 1; two singing males = 2; one female with a brood = 1).

Point counts were the most structured of the data collection protocols and were used only in priority blocks. The intent of implementing a point count framework was to expand upon the relative abundance analysis conducted for some common species in BBA1 based on North American Breeding Bird Survey point count data. A point count survey protocol was included in the original BBA2 handbook, including the data collection form (see Figure 7; which was later modified as explained below, to Figure 8).

Bird Point Census Form

State
SiteID
Latitude
Longitude
Habitat Type

Month
Day
Year
Time
Observer(s)
Temp.
Wind
Sky

BTBW = first observed 0-3 min.
BTBW = first observed 3-5 min.
BTBW = first observed 5-10 min.

Notes:

0 = none 0 = < 10% clouds
1 = 1 - 3 mph 1 = partly cloudy
2 = 4 - 7 mph 2 = mostly cloudy
3 = 8 - 12 mph 3 = overcast
4 = > 12 mph 4 = raining

100 m

		Indicate when first observed					
Alpha Code	#	Code	Status	0-3	3-5	5-10	Dist.

Dist. = minimum distance from observer:
1 = < 50 m; 2 = 50 - 100 m; 3 = > 100 m

S

Status

juvenile = J
nest = N
flyover = X
observed = (sex unknown) O

(continued)

		Indicate when first observed					
Alpha Code	#	Code	Status	0-3	3-5	5-10	Dist.

Dist. = minimum distance from observer:
1 = < 50 m; 2 = 50 - 100 m; 3 = > 100 m

Figure 7: Original BBA2 point count data collection form.

The point count survey protocol specified that each point be surveyed for a 10 minute interval broken into a 3 minute, 2 minute, and 5 minute segment.

Sampling was conducted with an unlimited radius, but the distance between the bird seen and the observer was to be recorded. When possible, sex and age were to be collected. A minimum of 25 point counts, ideally 20 points along roads and 5 points off roads, were to be collected in each priority block thus surveyed. Points to be surveyed along roads were selected by individual observers from a predetermined set of possible survey points such that they were roughly evenly spaced across the set of points within the block and contained a proportional representation of the land cover types present in the block. Selected survey points were required to be at least 250 meters from all other selected survey points. In blocks with few maintained roads, and thus few predetermined potential survey points, observers were instructed to supplement points up to 20 by identifying unmaintained roads (e.g. logging roads) and selecting additional road based points along these. Point counts were to be conducted in the 5 hours after dawn and during the period 1 June through 10 July. The data collection form was included in the atlas handbook for observers to copy and use (Figure 7).

This point count protocol was modified during the course of the atlas project. A later point count handbook was produced which specified that each point be surveyed for a 5 minute interval broken into a 3 minute and 2 minute segment. The protocol requires that 25 points be surveyed in each block but also refers to a “10-count minimum” for points in each block; functionally, paid observers were held to a 25 point/block minimum while volunteers were held to a 10 point/block minimum. The point count survey period in northern Michigan was retained as 1 June through 10 July, and the survey period for southern Michigan was changed to 24 May through 10 July. At this time, the data collection form was also modified (Figure 8). Data was collected for BBA2 using both protocols, but survey type coding in the database does not differentiate between 5 minute and 10 minute point counts.

MBBA II POINT COUNT DATA FORM										
Observer:				Town:	N/S	Range:	E/W	Block:	1/ 2/ 3/ 4	
Point #:		Date:		Time:		Latitude:	N	Longitude:	W	
Habitat type: a)					b)					
Temperature:				Wind:				Sky:		
				<input type="checkbox"/> none <input type="checkbox"/> 1-3 mph (smoke drifts/leaves rustle) <input type="checkbox"/> 4-7 mps (wind felt on face) <input type="checkbox"/> 8-12 mph (flags extended/leaves move) <input type="checkbox"/> >12 mph (dust and small branches move)				<input type="checkbox"/> <10% cloudy <input type="checkbox"/> partly cloudy <input type="checkbox"/> mostly cloudy <input type="checkbox"/> overcast <input type="checkbox"/> raining		
Species	1-3 MIN				4-5 MIN					Comments/
Code	< 50 m	50-100m	> 100 m	Flyovers	< 50 m	50-100m	> 100 m	Flyovers	TOTAL	Breeding Criteria


Figure 8: Modified BBA2 point count data collection form (form cropped at bottom).

Block checklists (Figure 10 & 11) were used to repeatedly visit a block over the course of a breeding season for more intensive surveying. Block checklists were also used to record data during blockbusting. Data on a block checklist represents a summary of breeding activity over a season rather than unique

sightings of individual birds. Observers recorded the number of hours spent in the block on each trip made to conduct surveying in the block as a measure of survey effort; this effort included all travel time within the block. When conducting surveys, observers would note the date a species was observed and the type of breeding behavior exhibited if the observed breeding behavior were at a higher confirmation level than was currently recorded on the checklist; observers would note the number seen if it were higher than the number currently recorded on the checklist. This could result in an entry in which the breeding confirmation level and number seen were collected on different dates. Figure 9 provides an example of how the observation date, number of birds observed, and breeding code recorded on a species checklist form could change over the course of a breeding season as an observer repeatedly visited locations within a single block.

4/5/2008: Observer A sees 1 eastern meadowlark in an open grassland (Location B)			
	observation date	number	breeding code
Current entry:	4/5/2008	1	#
4/15/2008: Observer A sees 3 eastern meadowlarks at Location B			
	observation date	number	breeding code
Current entry:	4/5/2008	3	#
4/18/2008: Observer A sees 8 singing male eastern meadowlarks at Location B			
	observation date	number	breeding code
Current entry:	4/18/2008	8	S
5/20/2008: Observer A sees 1 eastern meadowlark nest with eggs at Location B			
	observation date	number	breeding code
Current entry:	5/20/2008	8	NE

Figure 9. Hypothetical example of the data filtering algorithm used for block checklist data collection



Year _____
Location _____
County _____
Twp. _____
Range _____
Block _____ (Section) _____
Date _____ Hours _____ Location/Observers _____

Name _____
Address _____ Zip _____
Telephone _____
E-mail _____

SPECIES	DATE	#SEEN	OB	PO	PR	CO
Common Loon * T						
Pied-billed Grebe						
Red-necked Grebe * DO						
Least Grebe * DO						
American White Pelican * DO						
Double-crested Cormorant						
American Bittern * SC						
Least Bittern * T						
Great Blue Heron						
Great Egret						
Snowy Egret * DO						
Little Blue Heron * DO						
Tricolored Heron * DO						
Cattle Egret						
Green Heron						
Black-crowned Night-Heron * SC						
Yellow-crowned Night-Heron * DO						
Turkey Vulture						
Canada Goose						
Mute Swan						
Trumpeter Swan * T						
Wood Duck						
Goosander						
American Wigeon						
American Black Duck						
Mallard						
Blue-winged Teal						
Northern Shoveler						
Northern Pintail						
Common-winged Teal						
Crowfoot						
Redhead						
Ring-necked Duck						
Lesser Scaup * DO						
Bufflehead * DO						
Common Goldeneye						
Hooded Merganser						
Common Merganser						
Red-breasted Merganser						
Ruddy Duck						
Osprey * T						
Bald Eagle * T						
Northern Harrier * SC						
Sharp-shinned Hawk						
Cooper's Hawk * SC						
Northern Goshawk * SC						
Red-shouldered Hawk * T						
Broad-winged Hawk						
Red-tailed Hawk						
American Kestrel						
Merlin * T						

SPECIES	DATE	#SEEN	OB	PO	PR	CO
Peregrine Falcon * E						
Ring-necked Pheasant						
Ruffed Grouse						
Spruce Grouse * SC						
Sharp-shinned Grouse * SC						
Wild Turkey						
Northern Bobwhite						
Yellow Rail * T, DO						
Black Rail * DO						
King Rail * E						
Virginia Rail						
Sora						
Common Moorhen * SC						
American Coot						
Sandhill Crane						
Piping Plover * E						
Killdeer						
Lesser Yellowlegs * DO						
Spotted Sandpiper						
Upland Sandpiper						
Wilson's Snipe						
American Woodcock						
Wilson's Phalarope * SC, DO						
Ring-billed Gull						
Herring Gull						
Canada Tern * T						
Common Tern * T						
Forster's Tern * SC						
Black Tern * SC						
Rock Pigeon						
Mourning Dove						
Black-billed Cuckoo						
Yellow-billed Cuckoo						
Barn Owl * E						
Eastern Screech-Owl						
Great Horned Owl						
Barred Owl						
Great Gray Owl * DO						
Long-eared Owl * T						
Short-eared Owl * E						
Northern Saw-whet Owl						
Common Nighthawk						
Chuck-will's-widow * DO						
Whip-poor-will						
Chimney Swift						
Ruby-throated Hummingbird						
Belted Kingfisher						
Red-headed Woodpecker						
Yellow-bellied Woodpecker						
Yellow-bellied Sapsucker						
Downy Woodpecker						

SPECIES	DATE	#SEEN	OB	PO	PR	CO
Hairy Woodpecker						
Three-toed Woodpecker * DO						
Black-backed Woodpecker * SC						
Northern Flicker						
Pileated Woodpecker						
White-headed Woodpecker						
Eastern Wood-Pewee						
Yellow-bellied Flycatcher						
Acadian Flycatcher						
Alder Flycatcher						
Willow Flycatcher						
Least Flycatcher						
Eastern Phoebe						
Great Crested Flycatcher						
Western Kinglet						
Eastern Kingbird						
Loggerhead Shrike * E						
White-eyed Vireo						
Belt's Vireo * DO						
Yellow-throated Vireo						
Blue-headed Vireo						
Warbling Vireo						
Philadelphia Vireo						
Red-eyed Vireo						
Gray Jay						
Blue Jay						
American Crow						
Common Raven						
Horned Lark						
Purple Martin						
Tree Swallow						
Northern Rough-winged Swallow						
Bank Swallow						
Cliff Swallow						
Barn Swallow						
Black-capped Chickadee						
Boreal Chickadee						
Tufted Titmouse						
Red-breasted Nuthatch						
White-breasted Nuthatch						
Brown Creeper						
Carolina Wren						
Bewick's Wren * DO						
House Wren						
Winter Wren						
Scrub Wren						
Maryland Yellow * SC						
Golden-crowned Kinglet						
Ruby-crowned Kinglet						
Blue-gray Gnatcatcher						
Eastern Bluebird						

Figure 10: Block checklist form (front).

SPECIES	DATE	#SEEN	OB	PO	PR	CO
Veery						
Swainson's Thrush						
Hermit Thrush						
Wood Thrush						
American Robin						
Gray Catbird						
Northern Mockingbird						
Brown Thrasher						
European Starling						
Cedar Waxwing						
Blue-winged Warbler						
Cerulean-winged Warbler						
Tennessee Warbler						
Nashville Warbler						
Northern Parula						
Yellow Warbler						
Chestnut-sided Warbler						
Magnolia Warbler						
Cape May Warbler						
Black-throated Blue Warbler						
Yellow-rumped Warbler						
Black-throated Green Warbler						
Blackburnian Warbler						
Yellow-throated Warbler * T						
Pine Warbler						
Kirtland's Warbler * E						
Parula Warbler * E						
Palm Warbler						
Bay-breasted Warbler						
Cerulean Warbler * SC						
Black-and-white Warbler						
American Redstart						
Prothonotary Warbler * SC						
Worm-eating Warbler						
Ovenbird						
Northern Waterthrush						
Louisiana Waterthrush * SC						
Kentucky Warbler * DO						
Connecticut Warbler						
Mourning Warbler						
Common Yellowthroat						
Hooded Warbler * SC						
Wilson's Warbler						
Canada Warbler						
Yellow-breasted Chat						
Summer Tanager * DO						
Scarlet Tanager						
Eastern Towhee						
Chipping Sparrow						
Clay-colored Sparrow						
Field Sparrow						

SPECIES	DATE	#SEEN	OB	PO	PR	CO
Vesper Sparrow						
Lark Sparrow * X						
Savannah Sparrow						
Grasshopper Sparrow * SC						
Henslow's Sparrow * T						
Le Conte's Sparrow						
Song Sparrow						
Lincold's Sparrow						
Swamp Sparrow						
White-throated Sparrow						
Dark-eyed Junco						
Northern Cardinal						
Rose-breasted Grosbeak						
Indigo Bunting						
Dickcissel * SC						
Bobolink						
Red-winged Blackbird						
Eastern Meadowlark						
Western Meadowlark * SC						
Yellow-headed Blackbird * SC						
Rusty Blackbird						
Brewer's Blackbird						
Common Grackle						
Brown-headed Cowbird						
Orchard Oriole						
Baltimore Oriole						
Pine Grosbeak * DO						
Purple Finch						
Hessie Finch						
Red Crossbill						
White-winged Crossbill						
Pine Siskin						
American Goldfinch						
Evening Grosbeak						
House Sparrow						

BREEDING CRITERIA CODES

OB OBSERVED

O Species observed during its breeding season, but no evidence of breeding in block.

PO POSSIBLE

Species observed in suitable nesting habitat during its breeding season.

X Singing male present in suitable nesting habitat during its breeding season.

PR PROBABLE

S Singing male present at same location on at least two dates at least seven days apart or multiple (5 or more) singing males on same date during the breeding season.

P Pair observed in suitable nesting habitat during breeding season.

T Territorial behavior (chasing individuals of the same species).

C Courtship behavior or copulation.

N Visiting probable nest-site.

A Agitated behavior or anxiety calls from adult.

B Nest building by wrens or excavation of holes by woodpeckers.

CO CONFIRMED

NB Nest building by all except woodpeckers and wrens.

PE Physiological evidence of breeding or brooding based on bird in hand.

DD Distraction display or injury feigning.

UN Used nests or eggshells found.

Caution: These must be carefully identified.

FL Recently fledged young (of altricial species) incapable of sustained flight, or downy young (of precocial species) restricted to the natal area by dependence on adults or limited mobility.

DN Occupied nest—adults entering or leaving nest site in circumstances indicating occupied nest (includes high nest or nest-holes, the contents of which cannot be seen) or adult incubating or brooding.

FY Adult(s) with food for young (carrying food) or feeding young.

FS Adult carrying fecal sac.

NE Nest with eggs.

NY Nest with young seen or heard.

ATLAS ETHICS

Ethic I: Thoughtfulness of Birds

- Be quiet and unobtrusive.
- If you are observing nests for scientific studies, use caution and follow proven techniques to prevent predation and avoid abandonment.
- Avoid undue disturbance.
- Avoid excessive use of tape recorders, squeakers, and "pishing".

Ethic II: Thoughtfulness of Habitat

- Avoid trampling fragile habitats.
- Leave no litter.
- Keep motor vehicles on established roads and parking areas.
- Avoid smoking while walking.
- Use discretion in divulging information on nests of threatened and endangered species to other individuals.

Ethic III: Thoughtfulness of People

- Obtain permission for entry to private lands. Respect the occupant's privacy.
- When birding at a private residence, be considerate of your host's time and property.
- Respond to questions about your activities with courtesy and respect.
- Behave in a manner that does justice to the organizations you represent.

Figure 11: Block checklist form (back).

Michigan Breeding Bird Atlas II Casual Bird Observations Year _____
 (Breeding criteria codes on reverse side)

Name _____ Location _____
 Address _____ County _____
 _____ Zip _____ Twp. _____ Range _____
 Telephone _____ Block _____ (Section) _____

Month	Day	Species	# Seen	OB	PO	PR	CO

Return to Kalamazoo Nature Center
 7000 N. Westnedge Ave., Kalamazoo, MI 49009-6309

BREEDING CRITERIA CODES

OB OBSERVED
 O Species observed during its breeding season, but no evidence of breeding in block.

PO POSSIBLE
 # Species observed in suitable nesting habitat during its breeding season.
 X Singing male present in suitable nesting habitat during its breeding season.

PR PROBABLE
 S Singing male present at same location on at least two dates at least seven days apart or multiple (5 or more) singing males on same date during the breeding season.
 P Pair observed in suitable nesting habitat during breeding season.
 T Territorial behavior (chasing individuals of the same species).
 C Courtship behavior or copulation.
 N Visiting probable nest-site.
 A Agitated behavior or anxiety calls from adult.
 B Nest building by wrens or excavation of holes by woodpeckers.

CO CONFIRMED
 NB Nest building by all except woodpeckers and wrens.
 PE Physiological evidence of breeding or brooding based on bird in hand.
 DD Distraction display or injury feigning.
 UN Used nests or eggshells found.
 Caution: These must be carefully identified.
 FL Recently fledged young (of altricial species) incapable of sustained flight, or downy young (of precocial species) restricted to the natal area by dependence on adults or limited mobility.
 ON Occupied nest—adults entering or leaving nest site in circumstances indicating occupied nest (includes high nests or nest-holes, the contents of which cannot be seen) or adult incubating or brooding.
 FY Adult(s) with food for young (carrying food) or feeding young.
 FS Adult carrying fecal sac.
 NE Nest with eggs.
 NY Nest with young seen or heard.

Figure 12: Casual observation form (front & back)
 Casual observation cards (Figure 12) were intended to be used for data submission of opportunistically collected breeding evidence without targeted

survey effort. Examples of this type of data include species seen while driving to an assigned survey block, species seen at birdfeeders, and calls received from homeowners requesting assistance with inconveniently placed waterfowl nests in their yards. There is no measure of effort associated with these records.

Most observers who volunteered to conduct block surveys were instructed to use a block checklist to collect data. Paid staff observers were instructed to survey their block survey assignments using blockbusting and point counts; the proportion of their surveying to be conducted using point counts was specified. The distribution of point counts conducted by observers other than paid staff was primarily opportunistic and dependent on where qualified and willing observers resided. All three data collection protocols required observers to submit additional documentation when noteworthy species were seen: threatened, endangered, or extirpated species; special concern species; and species not confirmed breeding during BBA1. Very few observers submitted this additional documentation.

Breeding Codes:

Breeding codes used in BBA2 are comparable to those used in BBA1, with a few minor changes, and are similar to the standards of NORAC (<http://www.bsc-eoc.org/norac/atlascodes.htm>). Specifically, breeding codes S, P, FY, and FS do not have direct analogs in BBA1. When NORAC standard codes were modified or eliminated, this was done to simplify data collection and entry. As in BBA1, they are divided into categories: Observed, Possible, Probable, and Confirmed. While the breeding code used to indicate “Species observed in suitable nesting habitat during its breeding season.” on data forms was #, this behavior code was converted to V when keying data into the database. No other codes were modified between initial data collection and data entry.

Table 6. Breeding codes used in BBA2

Breeding category	Breeding code	Description
OBSERVED	O	Species (male or female) observed in a block during its breeding season, but no evidence of breeding. Not in suitable nesting habitat. Includes a wide range of species such as vultures or raptors, or a colonial nesting species not at the nesting colony.
POSSIBLE	# (V)	Species observed in suitable nesting habitat during its breeding season.
POSSIBLE	X	Singing male present in suitable nesting habitat during its breeding season.
PROBABLE	S	Singing male present at the same location on at least two dates at least 7 days apart or multiple (5 or more) singing males on the same date during the breeding season.
PROBABLE	P	Pair observed in suitable habitat during its breeding season.
PROBABLE	T	Permanent territory presumed through defense of territory (chasing individuals of the same species).

PROBABLE	C	Courtship behavior or copulation.
PROBABLE	N	Visiting probable nest-site.
PROBABLE	A	Agitated behavior or anxiety calls from adult.
PROBABLE	B	Nest building by wrens or excavation of holes by woodpeckers.
CONFIRMED	NB	Nest building by all except woodpeckers and wrens.
CONFIRMED	PE	Physiological evidence of breeding (e.g. highly vascularized, edematous incubation [brood] patch or egg in oviduct based on bird in hand. To be used by experienced bird banders on local birds during the nesting season).
CONFIRMED	DD	Distraction display or injury feigning.
CONFIRMED	UN	Used nests or eggshells found. Caution: these must be carefully identified, if they are to be accepted.
CONFIRMED	FL	Recently fledged young (either precocial or altricial) incapable of sustained flight, restricted to natal area by dependence on adults or limited mobility.
CONFIRMED	ON	Occupied nest: adults entering or leaving a nest site in circumstances indicating occupied nest. To be used for nests which are too high (e.g. the tops of trees) or enclosed (e.g. chimneys) for the contents to be seen.
CONFIRMED	FY	Adults carrying food for young or feeding young.
CONFIRMED	FS	Adult carrying fecal sac.
CONFIRMED	NE	Nest with egg(s).
CONFIRMED	NY	Nest with young seen or heard.

Data Processing and Analysis:

Atlas observers submitted their data forms directly to KNC or to the regional coordinators who then sent the data to KNC. More than half of all records were submitted directly to KNC, including all observations by paid observers. A cooperator designed a simple web based data entry form to allow observers to submit casual observations electronically; the web site generated an email to KNC each time a submission was made which included all data provided through the web form. Atlas staff estimate that data submitted via this web form accounted for less than 10% of all records collected. All submitted data was entered into a Filemaker Pro database for the duration of the data collection period. At the end of the project, all data was transferred to a Microsoft Access database. Mapping was performed using ArcMap 9.2 from queries generated from the main Microsoft Access database.

Sampling Goals:

A count of a minimum of 50 species in a block was set as the minimum threshold which would constitute sufficient block coverage. This threshold was selected based on prior surveying which suggested that most atlas blocks statewide supported at least 50 species. The number of hours needed to achieve this threshold varied widely depending on the skills of the individual observer and the species diversity in the block. A skilled observer might observe and record the same number of species in a block as a less skilled observer though in less time.

Table 7. Distribution of collected data between survey protocols

Metric	2001	2002	2003	2004	2005	2006	2007	2008	Total
Casual Records	1,061	7,288	7,842	3,708	7,686	7,419	7,909	5,347	48,260
Casual Cards	291	1,850	1,937	1,450	2,159	2,078	2,304	1,718	13,787
Point Count Records	12,016	9,979	19,132	25,711	22,868	19,261	18,441	17,707	145,115
Point Count Forms	537	424	1,558	1,369	1,281	1,075	865	789	7,898
Survey Checklist Records	5,978	24,300	26,531	31,257	43,409	57,072	79,750	42,462	310,759
Survey Checklist Forms	618	1,312	1,645	1,600	2,087	2,408	2,250	1,237	13,157
Records	19,055	41,568	53,505	60,676	73,963	83,752	106,100	65,516	504,134
Total Cards/Forms	1,446	3,586	5,140	4,419	5,527	5,561	5,419	3,744	34,842

Changes in data collection distribution reflect differences in priority block assignments from the first atlas. Each year prior to the beginning of that year's field season, all data was compiled by block and species and used to set objectives and assign areas in need of coverage for the coming season. Portions of the Southern Lower Peninsula were significantly oversampled relative to the rest of the state due to biased effort allocation by Kalamazoo Nature Center staff both in species surveying and in recruiting volunteer observers.

Effort is quantified as hours spend in the field. This information is not available for BBA1. This information was collected on species checklist forms during BBA2 and is a component of the protocol for point counts conducted during BBA2; effort was not collected on casual observation cards for BBA2.

Other Data Sources:

Data were also received from projects or species specific surveys from several agencies, organizations, and individuals.

Table 8. External data sets incorporated into BBA2.

Data source	Contact person	Data set
Bird Studies Canada		Marsh Monitoring Program data
CMU	Brian Johnson	Grassland bird surveys
CMU	Nancy Seefelt	Beaver Islands bird surveys
Common Coast Research and Conservation		Common loon observation data
Copper Country Audubon Club	Joseph Youngman	Manitou Island Bird Survey

Kalamazoo Nature Center		Fort Custer bird surveys
Kalamazoo Nature Center		Lowe's bird survey
Kalamazoo Nature Center		Kalamazoo County breeding bird survey
Kalamazoo Nature Center		Monterey wind farm monitoring project
Michigan Audubon Society		Michigan Seasonal Surveys 2002-2008
Michigan DNR		Ruffed grouse and wild turkey surveys
Michigan DNR	Terry Minzey	Sharp-tailed grouse lek surveys
Michigan DNR		Northern bobwhite quail surveys
Michigan DNR	Karen Cleveland	Peregrine falcon nest surveys
Michigan DNR		Woodcock banding data
Michigan DNR		Woodcock surveys
MNFI		Threatened, endangered, and special concern species element occurrences
MNFI	Julie Gibson	Grassland bird surveys
MNFI	Mike Monfils	Secretive marshbird surveys
MNFI	Mike Monfils	Nocturnal bird surveys
MNFI	Barb Barton	Caprimulgid surveys
MNFI	Mike Monfils	Camp Grayling bird surveys
MNFI		Common loon observation data
MNFI	Dave Cuthrell	Woodland raptor surveys
MNFI		Osprey observation data
MNFI	Mike Monfils	Diked wetland surveys
MNFI	Joelle Gehring	Wind farm pre-construction breeding bird surveys
MNFI	Joelle Gehring	Biodiversity Stewardship Area program assessment surveys
Michigan Loon Preservation Association		Common loon observation data
MSU	Bruce Robertson	Grassland bird surveys
MSU	Katie Kahl	PhD dissertation data (Great Lakes dune surveys)
MichiganMartins.com		Purple martin colony site database
Monitoring Avian Productivity and Survivorship (MAPS) Program*		Banding data
National Audubon Society	Caleb Putnam	Important Bird Area assessment surveying (common loon data and river surveys)
Rouge River Bird Observatory/University of Michigan-Dearborn	Julie Craves	Rouge River Bird Observatory Winter Bird Population Survey
Rouge River Bird Observatory/University of Michigan-Dearborn	Julie Craves	Rouge River Bird Observatory banding program

Southwest Michigan Land Conservancy		Land holdings surveys
University of Minnesota/USFWS	Francesca Cuthbert	Great Lakes Colonial Waterbird Count
USFS, Hiawatha NF	Kirk Piehler	Bird survey data
USFS, Huron NF		Sensitive species survey data
USFS, Ottawa NF		Bird survey data
USFWS	Tom Cooper	Woodcock
USFWS		Kirtland's warbler and piping plover survey data
USFWS	Dave Best & Matt Stuber	Bald eagle nest surveys
USFWS, Shiawassee NWR		Migratory Bird Inventory
Joe Kaplan and Keren Tischler		Isle Royale NP bird surveys
Sergej Postupalsky		Raptor nest survey data and associated bird observations
Adam Byrne		Pte. Mouillee SGA bird surveys
Russ Schipper		River bird surveys
USGS		North American Breeding Bird Survey

* Specific banding station details were not provided by KNC.

Editing and Verification:

It took about a year for KNC to edit all of the atlas data that was collected. It was checked by location with preliminary maps that were made available to species account authors and knowledgeable birders. Those with intimate knowledge of the habitat and species ranges for individual species looked for observations that appeared outside normal possibility for verification, and records were checked for field and data entry errors. Some species breeding criteria codes were edited for proper use and consistency; exact rules of modification of breeding code changes were not documented by KNC. Some colonial nesting species (Double-crested Cormorant, Ring-billed and Herring Gull, Caspian and Common Tern) breeding codes were downgraded from “possible” to “observed” since most of these birds are non-breeding wanderers; exact rules of modification of breeding code changes were not documented by KNC.

Block Coverage:

Atlas participants reported breeding birds from 5,812 (80.9%) of the total 7,188 survey blocks in the state. By region, 2,252 of 2,725 (82.6%) SLP blocks, 1,848 of 2,241 (82.5%) NLP blocks, and 1,712 of 2,222 (77.0%) UP blocks reported at least some degree of coverage. Total blocks with 50 or more species reported was 1,380 (50.6%) in the SLP, 726 (32.4%) in the NLP, and 683 (30.7%) in the UP; BBA1 had 1,488 (55.3%) in the SLP, 855 (38.7%) in the NLP, and 557(25.6%) in the UP.

The heaviest block coverage was in southwest Michigan, Washtenaw, Wayne, and Isabella Counties. Outside of this area, coverage was relatively uniform across the state.

Overall surveying in the priority blocks during this atlas was high, with 99% of the all priority blocks receiving some survey effort. In the SLP, all of the priority

blocks received survey effort. The NLP did not have any data for 8 of the 552 priority blocks. Of these 8 blocks, 6 were priority blocks on Great Lakes islands off Charlevoix and Leelanau counties. Only 14 of the 514 priority blocks in the UP did not have any data.

Township Coverage:

There were breeding birds reported from 1,855 (96.5%) of the 1,922 townships in this project. Of the 69 townships that did not report any species, all were either very small or partial townships and were located along the lakeshore or the state boundaries. The species totals that fall between 1 and 50 are an example of this. Most townships with species counts of 1 to 50 species were in or around Detroit or concentrated in areas of large scale agricultural practices such as in Huron, Saginaw, Tuscola and Genesee Counties. Townships that yielded totals of 51-75 species often occur where there is an extensive urban area and large units of homogeneous forest.

Atlas Results: The Species List:

This atlas survey produced a list of 247 breeding species (i.e. possible, probable, or confirmed breeding observations were submitted) in Michigan. Of these, confirmed breeding was observed for 225 species, probable breeding was observed for 12 species, and possible breeding was observed for 11 species. There were 8 species not recorded as breeders during the 2001-2008 atlas period that were present during the 1983-1988 breeding bird atlas. They are the monk parakeet, western kingbird, yellow-crowned night-heron, solitary sandpiper, tundra swan, black francolin, chukar, and cattle egret. Native to Argentina, the monk parakeet is often kept as a domesticated bird, which occasionally escapes and manages to nest in feral colonies, however those observed in the 1983-1988 atlas period in Oakland and St. Clair counties did not survive to be observed in BBA2. Similarly, chukar and black francolin are not native to Michigan, but private gamebird breeders in the state keep both of these species, and occasional escapes do occur. The Western Kingbird and Yellow-crowned Night-heron are on the extreme edge of their normal breeding areas and were not expected to be found. The Cattle Egret was seen during the atlas period in the summer months but was not considered breeding.

There were 16 species reported during this atlas survey that were not present in the first atlas. Eight of these species yielded confirmed breeding observations: red-necked grebe, American white pelican, black-necked stilt, Eurasian-collared dove, blue grosbeak, common eider, trumpeter swan, and Eurasian tree sparrow. Five species were observed at a probable breeding level: greater scaup, blackpoll warbler, little blue heron, orange-crowned warbler, and white-crowned warbler. Three species were observed at a possible breeding level: Bicknell's thrush, lark sparrow, and Mississippi kite. The increase in trumpeter swan breeding is a direct result of the trumpeter swan restoration project initiated in the mid 1980s which has resulted in several hundred breeding birds statewide. The Greater Scaup is represented by summering birds at the Pointe Mouillee State Game Area. Lark Sparrows were seen during BBA2 but have not been confirmed nesting in the state since 1959 (Payne 1983).

Table 9. Highest breeding confirmation level documented for species in BBA2

	CONFIRMED		PROBABLE	POSSIBLE
Canada goose	long-eared owl	ovenbird	northern pintail	mallard/black
mute swan	short-eared owl	Louisiana	greater scaup	duck hybrid
trumpeter swan	northern saw-	waterthrush	little blue heron	lesser scaup
wood duck	whet owl	northern	chuck-will's-	bufflehead
gadwall	common	waterthrush	widow	Mississippi kite
American wigeon	nighthawk	golden-winged	Bell's vireo	black rail
American black	eastern whip-	warbler	worm-eating	greater
duck	poor-will	blue-winged	warbler	yellowlegs
mallard	chimney swift	warbler	orange-crowned	lesser yellowlegs
blue-winged teal	ruby-throated	black-and-white	warbler	barn owl
northern	hummingbird	warbler	blackpoll warbler	American three-
shoveler	belted kingfisher	prothonotary	yellow-throated	toed
green-winged	red-headed	warbler	warbler	woodpecker
teal	woodpecker	Tennessee	Wilson's warbler	Bicknell's thrush
canvasback	red-bellied	warbler	white-crowned	lark sparrow
redhead	woodpecker	Nashville warbler	sparrow	
ring-necked duck	yellow-bellied	Connecticut	pine grosbeak	
common eider	sapsucker	warbler		
common	downy	mourning		
goldeneye	woodpecker	warbler		
hooded	hairy	Kentucky warbler		
merganser	woodpecker	common		
common	black-backed	yellowthroat		
merganser	woodpecker	hooded warbler		
red-breasted	northern flicker	American		
merganser	pileated	redstart		
ruddy duck	woodpecker	Kirtland's warbler		
northern	olive-sided	Cape May		
bobwhite	flycatcher	warbler		
ring-necked	eastern wood-	cerulean warbler		
pheasant	pewee	northern parula		
ruffed grouse	yellow-bellied	magnolia warbler		
spruce grouse	flycatcher	bay-breasted		
sharp-tailed	Acadian	warbler		
grouse	flycatcher	Blackburnian		
wild turkey	alder flycatcher	warbler		
common loon	willow flycatcher	yellow warbler		
pieb-billed grebe	least flycatcher	chestnut-sided		
red-necked	eastern phoebe	warbler		
grebe	great crested	black-throated		
eared grebe	flycatcher	blue warbler		
double-crested	eastern kingbird	palm warbler		
cormorant	loggerhead	pine warbler		
American white	shrike	yellow-rumped		
pelican	white-eyed vireo	warbler		
American bittern	yellow-throated	prairie warbler		
least bittern	vireo	black-throated		
great blue heron	blue-headed	green warbler		
great egret	vireo	Canada warbler		
green heron	warbling vireo	yellow-breasted		

CONFIRMED			PROBABLE	POSSIBLE
black-crowned night-heron	Philadelphia vireo	chat		
turkey vulture	red-eyed vireo	eastern towhee		
osprey	gray jay	chipping sparrow		
bald eagle	blue jay	clay-colored sparrow		
northern harrier	American crow	field sparrow		
sharp-shinned hawk	common raven	vesper sparrow		
Cooper's hawk	horned lark	savannah sparrow		
northern goshawk	purple martin	grasshopper sparrow		
red-shouldered hawk	tree swallow	Henslow's sparrow		
broad-winged hawk	northern rough-winged swallow	Le Conte's sparrow		
red-tailed hawk	bank swallow	song sparrow		
American kestrel	cliff swallow	Lincoln's sparrow		
merlin	barn swallow	swamp sparrow		
peregrine falcon	black-capped chickadee	white-throated sparrow		
yellow rail	boreal chickadee	dark-eyed junco		
king rail	tufted titmouse	summer tanager		
Virginia rail	red-breasted nuthatch	scarlet tanager		
sora	white-breasted nuthatch	northern cardinal		
common gallinule	brown creeper	rose-breasted grosbeak		
American coot	Carolina wren	blue grosbeak		
sandhill crane	house wren	indigo bunting		
piping plover	winter wren	dickcissel		
killdeer	sedge wren	bobolink		
black-necked stilt	marsh wren	red-winged blackbird		
spotted sandpiper	blue-gray gnatcatcher	eastern meadowlark		
upland sandpiper	golden-crowned kinglet	western meadowlark		
Wilson's snipe	ruby-crowned kinglet	yellow-headed blackbird		
American woodcock	eastern bluebird	rusty blackbird		
Wilson's phalarope	veery	Brewer's blackbird		
herring gull	Swainson's thrush	common grackle		
ring-billed gull	hermit thrush	brown-headed cowbird		
Caspian tern	wood thrush	orchard oriole		
black tern	American robin	Baltimore oriole		
common tern	gray catbird	purple finch		
Forster's tern	northern mockingbird	house finch		
rock pigeon	brown thrasher	red crossbill		
Eurasian collared-dove	European starling	white-winged		
mourning dove	cedar waxwing			
yellow-billed cuckoo				

CONFIRMED			PROBABLE	POSSIBLE
black-billed cuckoo eastern screech- owl great horned owl barred owl great gray owl	Brewster's warbler Lawrence's warbler	crossbill pine siskin American goldfinch evening grosbeak house sparrow Eurasian tree sparrow		

(Process_Step 2 (or “b”) continued ...)

(2.5.2.b.2) Sources_Used_Citation_Abbreviation: BBA2

(2.5.2.b.3) Process_Date: 2011-2012

(2.5.2.b.4) Process_Time: (not applicable, as over long period)

(2.5.2.b.5) Source_Produced_Citation_Abbreviation: **BBA2**

(2.5.2.b.6) Process_Contact:

(2.5.2.b.6.1) Contact_Person_Primary:

(2.5.2.b.6.1.1) Contact_Person: Karen Cleveland (but recommend using the contact position and contact organization, listed below)

(2.5.2.b.6.1.2) Contact_Organization: State of Michigan, Department of Natural Resources, Wildlife Division

(2.5.2.b.6.2) Contact_Organization_Primary: State of Michigan, Department of Natural Resources, Wildlife Division

(2.5.2.b.6.3) Contact_Position: MDNR Wildlife Division’s All Bird Biologist

(2.5.2.b.6.4) Contact_Address:

(2.5.2.b.6.4.1) Address_Type: mailing address

(2.5.2.b.6.4.2) Address: P.O. Box 30444

(2.5.2.b.6.4.3) City: Lansing

(2.5.2.b.6.4.4) State_or_Province: MI

(2.5.2.b.6.4.5) Postal_Code (ZIP or ZIP+): 48909-7944

(2.5.2.b.6.4.6) Country: United States of America

(2.5.2.b.6.5) Contact_Voice_Telephone: 1-517-284-9453

(2.5.2.b.6.6) Contact_TDD/TTY_Telephone: 711 (Michigan Relay Center)

(2.5.2.b.6.7) Contact_Facsimile_Telephone: 1-517-373-9566

(2.5.2.b.6.8) Contact_Electronic_Mail_Address: DNR-Wildlife@michigan.gov ;

Those interested can also see the MDNR website at <http://www.michigan.gov/dnr> for more information.

(2.5.2.b.6.9) Hours_of_Service: recommended Universal / GMT 12noon – 8pm or United States Eastern Standard Time 8am – 5pm

(2.5.2.b.6.10) Contact_Instructions: No significant instructions, other than: (a.) Please have patience as it may take a couple of days to reply back to questions, depending on the methods used (email, etc.) to contact our organization, (b.) please refer to this data set by its proper name of “Michigan Breeding Bird Atlas data set” or other relevant details, in any message or with questions.

(2.5.2.c) Process_Step: 3 (or “c”)

(2.5.2.c.1) Process_Description: Michigan Breeding Bird Atlas data set. Processing steps and methodology done on the project tabular or relational data set information:

The purpose of this process step and substeps were to (a.) identify and correct errors in the BBA2 data set, (b.) combine the BBA1 data set and BBA2 data set into a single unified database, and (c.) ensure that the combined database was compatible with a GIS atlas block layer (discussed in process step 3 or “D” after this step).

Initial Data Quality Assessment:

KNC delivered the “final and complete” dataset of observations to the MDNR in September 2009 as a Microsoft Access database and ESRI compatible shapefiles delineating survey block and township boundaries. After receipt of the files, MDNR staff conducted basic data consistency checks of the dataset in the database and associated shapefiles and corrections were made, where possible.

Table 10. Data consistency tests of the BBA2 data set performed by the DNR

Data consistency test	Errors found	Corrections made
All observations contain valid species codes	Species codes AMWP, COEI, ETSP, and WFIB appear in the observation table but not the bird code table; 10 records impacted.	American white pelican, common eider, Eurasian tree sparrow, and white-faced ibis records added to bird code table
All observations contain valid breeding codes	Breeding codes A<control character>, AY, C<control character>, IM, N<control character>, O<control character>, P<control character>, S<control character>, T<control character>, U, V<control character>, X<control character>, XX appear in the observation table but not the breeding code table; 219 records impacted.	All control characters deleted.(214 records) AY changed to FY. (1 record) Record with IM code deleted. (1 record) Records with U code deleted.(2 records) Record with XX code deleted. (1 record)
All observations contain valid survey card number codes	No errors.	
All observations contain valid observation dates (during atlas period)	No errors.	
No observations contain NULL fields	Bird count missing; 1 record impacted.	No change made.
No observation records contain duplicate information	Multiple duplicate records found.	Duplicate records retained on the assumption that these represent multiple observations of the same species in a survey block.

All survey cards contain valid observer codes	No errors.	
All survey cards contain valid survey years (during atlas period)	No errors.	
All survey cards contain valid survey type codes	No errors.	
All survey cards contain valid survey block codes (i.e., are contained within the database's list of survey blocks)	Survey block codes 38N21W3 and 43N16E2 appear in survey card table but not the survey block table; 2 records impacted.	38N21W3 (open water, Lake Michigan; observation of American woodcock with young) changed to 38N21W2 (Stonington Peninsula) 43N16E2 (approximately 45 miles east of the easternmost end of Drummond Island [42N08E3]) and associated survey form and bird observation removed from the database. Source data form could not be found to verify user submitted survey block information.
All survey cards contain valid observer codes	No errors.	
No survey card records contain duplicate information	No errors.	
No survey cards contain NULL values for required fields	No errors.	
All survey cards contain associated bird observations	Cards 26573, 37731, 40190, and 40191 contain no observations. 4 records impacted.	Survey card records retained.
All valid survey blocks are included in the database	No errors.	
All survey blocks contain valid direction designations (e.g., N, S, E, W)	No errors.	
All survey blocks contain valid geographical locations (i.e., exist in the state of Michigan)	Invalid block codes: 01N16E1, 01N16E2, 02N16E4, 03S12E2, 05S11E1, 09S09E1 (09S09E1 lies wholly within Ohio, the other blocks lie wholly within Ontario). 6	Block code references removed from the database.

	records impacted.	
All survey blocks are correctly assigned to counties	Incorrect county assignments: 39N02W2 (Cheboygan), 30N10E2 (Alcona), 18N09E2 (Huron). 3 records impacted. Note: Several blocks cross county boundaries where county boundaries are based on waterways rather than PLSS survey lines (e.g., Wayne/Monroe county line).	39N02W2 changed to Mackinac. 30N10E2 changed to Alpena. 18N09E2 changed to Arenac.
No survey block records contain duplicate information	No errors.	
No survey blocks contain NULL fields	County code missing for blocks 01N16E1, 01N16E2, 02N16E4; 3 records impacted.	These blocks are all wholly within Ontario.
All valid counties are included in the database; county names are spelled correctly	No errors.	
All county designation codes (e.g., atlas region codes) are consistent with printed BBA documentation	No errors.	
No county records contain duplicate information	No errors.	
No counties contain NULL fields	Coordinator code missing for 25 counties; 25 records impacted.	Coordinator designated as an optional field for future data management.
All valid breeding codes are included in the database	No errors.	
All breeding code descriptors are consistent with printed BBA documentation	Descriptions of breeding codes O, T, PE, UN, ON, and FY vary slightly from printed descriptions; 6 records affected.	Text modified to match printed BBA definitions.
All breeding code confirmation levels are consistent with printed BBA documentation	No errors.	
All breeding code sorting values are consistent with printed BBA documentation	No errors.	
No breeding code records contain duplicate	No errors.	

information		
No breeding codes contain NULL fields	No errors.	
All valid species are included in the database (i.e., all species with observations also have additional species documentation)	See above for AMWP, COEI, ETSP, and WFIB; 4 records impacted.	Four new species records added.
All species documentation contains valid species (i.e., all records refer to species recognized on the AOU Checklist)	<p>Invalid species: Accipiter, Band Destroyed, Band Lost, Blackbird species, Buteo species, Crossbill species, Cuckoo species, Dowitcher species, Duck species, Falcon species, Finch species, Flycatcher species, Goose species, Grebe species, Grosbeak species, Gull species, Hawk species, Heron species, Hummingbird species, Hybrid Passerine, Kinglet species, Loon species, Mallard x Black Duck Hybrid, Merganser species, Meadowlark species, Nuthatch species, Owl Species, Owl species, Record Lost, Redpoll Species, Sandpiper species, Scaup Species, Scoter species, Shrike species, Sparrow species, Swallow species, Swan Species, Thrush Species, Unknown Bittern, Unidentified Bird, Vireo species, Warbler Species, Woodpecker Species, Wren Species, Yellowlegs Species. 45 records impacted.</p> <p>Note: several additional species were included in the database which are not native breeding species in Michigan and which had no observations submitted (e.g., Amazonia parrot, snow goose).</p>	<p>One observation of mallard x American black duck hybrid submitted; this species record was retained.</p> <p>All other invalid species records removed.</p>
All species documentation	No errors.	

contains valid species alpha codes		
All species documentation contains valid common names	Invalid species: common moorhen. 1 record impacted	Common name changed to common gallinule.
All species documentation contains valid AOU codes	AOU has not supported a numbered classification scheme since 1997 (Checklist of North American Birds, 7 th Edition, page xi ; available online at http://www.aou.org).	Disregard all AOU numbers.
All species documentation contains valid MI ESA/US ESA status codes	Invalid status values for bald eagle, osprey, Henslow's sparrow, Forster's tern, cerulean warbler, Louisiana waterthrush, common gallinule, and Cooper's hawk. No values provided for US ESA. 8 records impacted.	Status code for bald eagle and osprey changed to SC. Status code for Henslow's sparrow changed to E. Status code for Forster's tern, cerulean warbler, Louisiana waterthrush, and common gallinule changed to T. Status code for Cooper's hawk changed to NULL.
All species documentation contains valid taxonomic order sorting values	162 of 407 records contain no taxonomic order sorting value. 162 records impacted.	No changes made at this time. Updates made during database translation.
No species documentation contain duplicate records	No errors.	
No species documentation contains NULL values in required fields	No errors.	
No observer records contain duplicate observers	Two observers were each entered twice. One entry for each observer contained the name of a second observer as well. Note: Several observer records contained multiple names when there were only sufficient fields to track a single name, violating basic standards of atomic organization of data fields.	No changes made at this time. Updates made during database translation.
No observers records are	No errors.	

NULL		
All tables contain unique information (i.e., do not contain only query results based on the content of other tables)	<p>Two linked tables were included in the database; the source files of these linked tables were not provided.</p> <p>Eight tables were included that were the result of queries of other tables in the database.</p> <p>Four tables were included that appear to contain some quantification of landuse or landcover. No documentation was provided for these tables, and their provenance is unknown.</p> <p>One table was included that appears to contain survey results of a habitat assessment for cerulean warbler. No documentation was provided for this table which contains data for locations outside of Michigan, and its provenance is unknown.</p> <p>One table contains a list of survey block codes used in BBA1.</p>	The BBA1 table was retained; all other tables were deleted.
All tables contain key fields	The observation data table does not contain a primary key.	No correction made to submitted database. Errors corrected during database translation.
Relational integrity requirements have been assigned correctly between database tables	The relationships between survey form and individual bird observation, survey block and survey form, and observer and county implement incorrect join types. No relationships enforce referential integrity.	No correction made to submitted database. Errors corrected during database translation.
All fields are appropriate data types	Most fields formatted with appropriate data types.	No correction made to submitted database. Errors corrected during database translation.
All survey blocks in the database are represented in the survey block	Survey blocks 48N05W3 (Tahquamenon Island) and 38N07W3 (Ile aux	Records retained in database. No correction made to

shapefile	Galets/Skillagallee) are missing from the shapefile. 2 survey form records and 7 bird observation records impacted.	submitted shapefile. See Section 2.5.2.c. Process_Step 4 (or “D”) for additional details.
All survey blocks in the survey block shapefile are valid.	Invalid survey blocks: 01N16E1, 01N16E2, 02N16E4, 03S12E2, 05S11E1, 09S09E1 are located outside of the state of Michigan (all are located in Ontario with the exception of 09S09E1 which is located in Ohio). 6 records impacted.	No correction made to submitted shapefile. See Section 2.5.2.c. Process_Step 4 (or “D”) for additional details.
All survey blocks in the database are represented in the township shapefile	No errors.	

Beyond the errors detected in individual records, other shortcomings to the structure of the database were found. The structure of the data tables violated the rules of third normal form standard to well organized databases. The database tables lacked indexes which would improve query performance and speed. The database size was such (950 MB) that query speed was impacted. The decision was made for MDNR staff to develop a new 3NF data structure that would result in a smaller data file, allow for the simultaneous storage and querying of BBA1 and BBA2 data, be designed to easily link to GIS data layers, and perform queries faster.

The new data structure was implemented in a Microsoft Access 2003 SP3 database. Table and field name formats were standardized, and field data types were assigned such that file size was minimized. Primary keys were set to surrogate key values assigned using the Microsoft Access autonumber data type. Surrogate keys were used in place of natural keys (e.g., species code value, survey block number) to save storage space and minimize data upkeep necessary to update changing values for species or survey participants. Relationships were defined for all tables and the necessary flags were set to ensure that Microsoft Access enforces the referential integrity of these relationships (i.e., if the primary key of table A has a relationship to a field in table B, no record can exist in B where this field value does not also appear as a field value in the primary key of A).

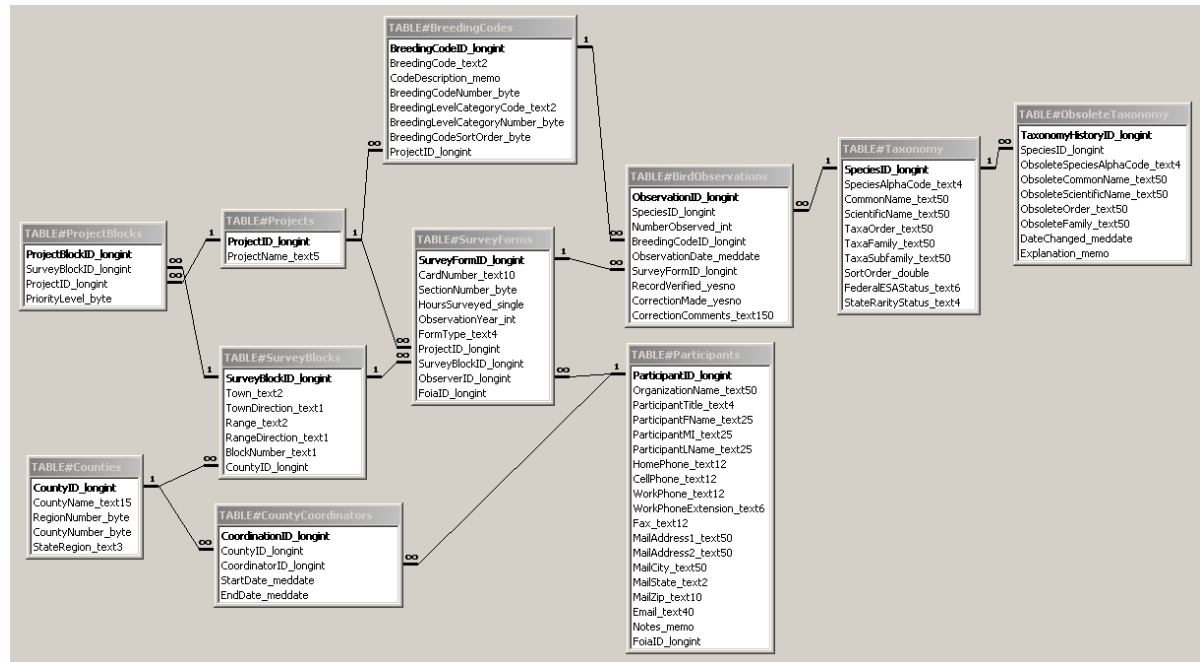


Figure 13. Relationship diagram of new Breeding Bird Atlas database. *Please note:* because this information is critical to a good understanding of the data set, this figure is duplicated at a larger size, on the last page of this document.

Beyond these structural design issues, several additional changes and corrections were implemented during the translation of the existing BBA1 and BBA2 data into the new database structure. Since both BBA1 and BBA2 data would be stored in the new database, fields were added to tables, as needed, to be able to differentiate between BBA1 data and BBA2 data. Specifically, fields were added to the survey form table and breeding code table, and an additional table was added to track the survey blocks that were considered active and available for survey during each atlas project. Several fields that were obsolete, redundant, empty, or which lacked documentation to explain their contents were removed (e.g., AOU number, email2 for each observer, species habitat association). Where two or more individuals were documented in a single record in the table of observers, excess details were removed and only a single individual retained. In most cases, the individual retained was the first one listed in the record. If this individual already appeared in another record in the table, the second individual was retained. All tables in the original database which consisted solely of query products with no independent records or fields were discarded. Tables which were undocumented and which did not contain fields which could be positively identified as either a data product of the atlas survey process or a supplemental data set that could be immediately related to a data product of the atlas survey process were discarded. An additional table was implemented in the new database to document taxonomic changes implemented since the completion of the BBA1 project to allow for greater ease in comparing electronic and hard copy species documentation over the course of the atlas projects. Finally, indexes were added, where necessary, to optimize speed for performing common queries.

Species data was updated to reflect taxonomy as listed in the American Ornithologists' Union Check-list of North American Birds, 7th Edition, 52nd Supplement, and species status under the Michigan Endangered Species Act and United States Endangered Species Act as of 30 September 2012. Only species observed during either BBA1 or BBA2 were included in the species table. Common name, scientific name, order, family, and subfamily were taken from the Check-list of North American Birds. The taxonomic sort order of species is based on the species list order from the Check-list of North American Birds.

Because of irregularities discovered during basic data quality checks and during the translation of the data to the new data structure, more intensive data verification was performed. The goal of this verification was to compare entries from hard copy survey forms with electronic records in the table TABLE#BirdObservations to verify (a.) that the observations in the database originated on submitted survey forms, (b.) all observations submitted on survey forms were captured in the database, and (c.) all observation data in the database accurately reflected data submitted on survey forms.

Three fields were added to the table TABLE#BirdObservations to track the verification process: RecordVerified_yesno, CorrectionMade_yesno, and CorrectionComments_text150. Verification fields were not added to any other tables in the database. A value of FALSE in the RecordVerified_yesno field indicates that the electronic record was not located on a hard copy survey form; a value of TRUE indicates that the electronic record was located on a hard copy survey form. This field also contains the value FALSE for all survey forms that were not examined during the verification process. A value of TRUE in the CorrectionMade_yesno field indicates that the electronic record was modified based on the content found on a hard copy survey form; a value of FALSE indicates that the record has not been modified. Some hard copy survey forms were found during the verification process that had been filled out incorrectly or incompletely. In these cases, KNC staff sometimes extrapolated data values and included the observation in the database. When these instances were found, no correction was possible based on the hard copy survey form, and a value of FALSE was recorded for CorrectionMade_yesno. The CorrectionComments_text150 field was used to record the content of changes made to the record when the CorrectionMade_yesno field is TRUE or data issues found with the record which couldn't be corrected when the CorrectionMade_yesno field is FALSE.

The intent of this verification was to add or correct records in the table TABLE#BirdObservations, therefore no verification tracking fields were added to other tables. However, as verification proceeded, errors were discovered in the TABLE#SurveyForms and TABLE#Participants tables. These were corrected when discovered though they were not tracked or quantified. The most common error was the inclusion of an incorrect value for HoursSurveyed_single. This could take one of three forms: (a.) no value on the hard copy form and a value in the database; (b.) partial effort accounting on the hard copy survey form (e.g., observations recorded on three dates, effort only recorded for two dates); and (c.) a complete estimate of effort on the hard copy survey form and a different value recorded in the database. Given

the common, yet unpredictable, frequency of these errors, values in this field should be uniformly treated as suspect.

While ideally the full BBA2 data set would be verified against source documents, the size of the data set and limited resources available for verification necessitated that only a subset of the full dataset was verified. All volunteer submitted survey forms for Chippewa, Kalamazoo, Leelanau, Lenawee, Livingston, Luce, and Mackinac counties were verified with the exception of point county survey forms. Unverified records in these counties may be the result of data submitted via electronic means for which there were no hard copy survey forms.

Table 11. Distribution of verified bird observation survey forms

County	Survey forms verified	Records verified
Chippewa	289	5,627
Jackson	3	22
Kalamazoo	1401	25,166
Leelanau	104	2,632
Lenawee	71	1,957
Livingston	138	2,937
Luce	188	3,410
Mackinac	189	3,472
Washtenaw	3	9

See [Section 6.6 comments](#) for technical details on produced files, sizes in bytes, exact file names, and more.

(2.5.2.c.2) Sources_Used_Citation_Abbreviation: MDNR BBA1 and MDNR BBA2

(2.5.2.c.3) Process_Date: 2000-2012

(2.5.2.c.4) Process_Time: (not applicable).

(2.5.2.c.5) Source_Produced_Citation_Abbreviation: **MDNR BBA1 and MDNR BBA2 combination data set.**

See [Section 6.6 comments](#) for technical details on produced files, sizes in bytes, exact file names, and more.

(2.5.2.c.6) Process_Contact:

(2.5.2.c.6.1) Contact_Person_Primary:

(2.5.2.c.6.1.1) Contact_Person: Karen Cleveland but recommend using the contact position and contact organization, listed below.

(2.5.2.c.6.1.2) Contact_Organization: State of Michigan, Department of Natural Resources, Wildlife Division

(2.5.2.c.6.2) Contact_Organization_Primary: State of Michigan, Department of Natural Resources, Wildlife Division

(2.5.2.c.6.3) Contact_Position: MDNR Wildlife Division's All Bird Biologist

(2.5.2.c.6.4) Contact_Address:

(2.5.2.c.6.4.1) Address_Type: mailing address

(2.5.2.c.6.4.2) Address: P.O. Box 30444

(2.5.2.c.6.4.3) City: Lansing

(2.5.2.c.6.4.4) State_or_Province: MI

(2.5.2.c.6.4.5) Postal_Code (ZIP or ZIP+): 48909-7944

(2.5.2.c.6.4.6) Country: United States of America

- (2.5.2.c.6.5) Contact_Voice_Telephone: 1-517-284-9453
 - (2.5.2.c.6.6) Contact_TDD/TTY_Telephone: 711 (Michigan Relay Center)
 - (2.5.2.c.6.7) Contact_Facsimile_Telephone: 1-517-373-9566
 - (2.5.2.c.6.8) Contact_Electronic_Mail_Address: DNR-Wildlife@michigan.gov ;
Those interested can also see the MDNR website online at <http://www.michigan.gov/dnr> for more information.
 - (2.5.2.c.6.9) Hours_of_Service: recommended Universal / GMT 12noon – 8pm
or United States Eastern Standard Time 8am – 5pm
 - (2.5.2.c.6.10) Contact_Instructions: No significant instructions, other than: (a.)
Please have patience as it may take a couple of days to reply back to questions, depending on the methods used (email, etc.) to contact our organization, (b.) please refer to this data set by its proper name of “Michigan Breeding Bird Atlas data set” or other relevant details, in any message or with questions.
- (2.5.2.d) Process_Step: 4 (or “d”)
- (2.5.2.d.1) Process_Description: MDNR Wildlife Division GIS layer for blocks.
Processing Steps and Methodology Done on the Atlas Blocks Polygon Layer:
The Atlas Block layer represents an excellent example of a data collection framework being migrated from older graphic or computer-aided drafting (CAD) file data being brought forward to detailed georeferenced GIS layer status. Before the completion of BBA1, the Atlas Block layer was sufficient for planning and collecting work, because GIS was not being used like at the end of BBA1 and later. In 2000 with the cooperatively improved KNC (who provided data), MNFI (who provided reviewers and comments) and DNR (who provided expertise to correct and upgrade) as per citation KNC/DNR/MNFI 2000, the BBA1 biological data received improvements with attribute and errors corrections, plus at this same time an improved Atlas Block layer was create. Later at the end of BBA2, GIS technology had improved more and it was found that the existing Atlas Block layer had issues and had to again be improved in order to be used as planned with a connection to the tabular (Microsoft Access) database or extracted queries from that observational database. An improved GIS layer was required, and would be used for both improved and combined BBA1 and BBA2 data. Source was both BBA1 shapefile and BBA2 shapefile.
- During the “end-of-BBA2”, KNC provided source data for Atlas block boundaries had data standardization, completeness, format, and other issues which impacted the ability to make comparisons and analyses across data sets or appropriately using the observed data in GIS connected by the specific defined block. This data had mismatches in linework, slivering, blocks composed of multiple polygons or parts, issues with the matching of KNC provided products (e.g., block and township boundaries not aligned, blocks outside Michigan, missing some blocks, duplication of same block coding, omissions, commissions, etc.).
- The purpose of this process step was to create a dependable Michigan Breeding Bird block layer at a moderately detailed scale such as 1:24,000 and ensure the layer is compatible with the block codes in the tabular database which allows those tabular data to be displayed in GIS within the geographic framework of Atlas blocks. A single master Block layer was needed to allow simultaneous display of BBA1 and BBA2 data geographically using a GIS software tool. ESRI's ArcGIS software allows a connection between the GIS

layer and the Access database tables, using the unique Atlas Block ID to join the appropriate polygon with the tabular data of interest.

Final GIS layer formats include two options: the ESRI ArcGIS Personal Database layer and an ESRI Shapefile. The ESRI ArcGIS Personal Database layer requires ESRI's ArcGIS software version 9.0 or newer. However, the ESRI Shapefile format is used by a wide variety of GIS companies and has become a common data transfer format.

State of Michigan boundary layer:

A State County outline layer was created from (a.) the State County 1:100,000 scale USGS Digital Raster Graphic polygon layer; (b.) the State County 1:24,000 scale USGS Digital Raster Graphic polygon layer; and (c.) BING online imagery and hybrid map layer. Both the State map layers are provided at the Michigan Geographic Data Library (MGDL. 2012. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. <http://www.mcgi.state.mi.us/mgdl>. Accessed 11 October 2012). Bing imagery and the BING hybrid imagery are provided at <http://www.bing.com/maps>.

The best available information was used to develop a boundary extent layer for Michigan. This was done by combining the two USGS data layers and checking the State and International Border placement using detailed BING imagery. A review of the entire State of Michigan boundary was done on-screen using the BING online data resources, at screen resolution of 1:10,000 scale, to search for any visible variations of line, then zoomed-in to 1:3,000 scale or finer to edit the boundary of Michigan. These edited and confirmed lake-ward boundary lines were done at smaller scale than 1:24,000 so they could be aggregated with the 1:24,000 scale USGS Digital Raster Graphic lines for the landward portions of Michigan. The end result is compliant and compatible with 1:24,000 scale data. The product layer is the most detailed version of the entire State of Michigan boundary which could be found and developed for use in later processing of the Atlas blocks. This new outline layer is provided in the final data set, and is called "MichiganDNR_Breeding_Bird_Atlas_outline_polygon ..." (available as an ArcGIS Personal Database layer and an ESRI Shapefile)

Atlas Block Layer:

The standard as defined in the PLSS for township, range and section property extent descriptions are that a township-and-range block is approximately 6 miles by 6 miles (varies with the placement of the PLSS grid on the ground, with corrections or changes in the grid caused by survey issues, curvature of the earth, etc.), and sections are 1 mile by 1 mile with 36 total in a typical township-and-range block.

The Michigan PLSS is a specific set of information about the PLSS irregular grid system for the State of Michigan. The Michigan geospatial data comes from the source: MGDL. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. <http://www.mcgi.state.mi.us/mgdl>. Accessed 11 October 2012. The PLSS is structured according to the standards and practices in: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey

System (PLSS) manual). Bureau of Land Management (BLM; 1946 to present) and Government Land Office (GLO; 1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA. <http://www.blmsurveymanual.org/index.html>. Accessed 20 November 2012.

When the terms “township” or “town-and-range block” are used, these refer to a block one township increment tall by one range increment long/wide and not to the political unit of “township”. The BBA project uses quarter township-and-range blocks (or 9 sections) for an approximate 3 mile by 3 mile area. Starting with source PLSS section-level GIS layer for Michigan at <http://www.mcgi.state.mi.us/mgdl/?rel=thext&action=thmname&cid=10&cat=Public+Land+Survey+Sections>, queries were run to select and recode sections to blocks, then a GIS dissolve process was run to aggregate sections with the same Atlas Block ID to a single Atlas Block polygon.

Specifically, the following assignment and re-grouping of standard PLSS sections to blocks were completed:

Block 1 = Sections 1, 2, 3, 10, 11, 12, 13, 14, 15.

Block 2 = Sections 4, 5, 6, 7, 8, 9, 16, 17, 18.

Block 3 = Sections 19, 20, 21, 28, 29, 30, 31, 32, 33.

Block 4 = Sections 22, 23, 24, 25, 26, 27, 34, 35, 36.

This method assumed the sections within a township/tier and range grid block followed the same standard defined for the PLSS (see Figure 6 presented earlier).

For some of the extent of the State of Michigan, section boundaries had to be created by connecting or extending existing PLSS grid lines, extending PLSS grid lines, or extrapolating the appropriate Atlas block boundary lines to create Atlas Blocks in unsurveyed areas. Michigan has several PLSS correction zones, or locations where the town-range, or town-range-section lines widen or narrow and interrupt the regular grid system across the State. For areas of correction, the correction was continued at the same level as the last location known or defined in source data. This extrapolation resulted in some blocks extending past the State boundary; however they were later constrained to within the Michigan extent.

The individual Atlas Block polygons were described using a specific feature-based metadata method, or by describing each polygon in terms of source and conditional quality. Each polygon is specifically identified with one of the following four comment lines: “completed entire block with PLSS sections (all block); highest confidence in location” ; “completed block with PLSS sections (part of block); high confidence in location” ; “created block by connecting PLSS grid/ sections (part); moderately high confidence in location”; and “created block by extended/ extrapolated PLSS grid for blocks; moderate/good confidence in location”.

Attribute information was related back to the Atlas Blocks for township and range identifiers, and those were used with the Atlas Block code to generate the final Atlas Block ID field per polygon. This Atlas Block ID value is the unique ID used to connect the data in the Access database, to the geographic framework.

This product layer was checked for logical consistency by examining for unattributed polygons, a check for slivers, and a check that the town and range identifiers run in the correct directions and are grouped correctly. No specific numerical or quantitative based checks were done of this layer.

The layer results in 11,199 total polygons. The township identifiers span 09S to 01S then 01N to 68N (there is no a 00); the range identifiers span 20E to 01E then 01W to 49W (there is no 00).

Block 1: totaled 2,799 blocks.

Block 2: totaled 2,801 blocks.

Block 3: totaled 2,796 blocks.

Block 4: totaled 2,803 blocks.

“completed entire block with PLSS sections (all block); highest confidence in location”: 6,560 blocks

“completed block with PLSS sections (part of block); high confidence in location”: 645 blocks

“created block by connecting PLSS grid/sections (part); moderately high confidence in location”: 1,451 blocks

“created block by extended/extrapolated PLSS grid for blocks; moderate/good confidence in location”: 2,543 blocks

Layer XY coordinate resolution is 0.000000007139322 meters (system setting) with XY coordinate tolerance 0.001 meters (distance two points must be apart to be considered distinct). The practical resolution is much higher, between 21.95 meters and 109.7 meters (72 to 360 feet) (see Section 2.4.1 for discussion of positional accuracy estimates and explanation).

Six Atlas Block ID codes were found to belong to polygons which were split and appropriately exist as two polygons but have a single ID code. Using data values in attribute field “Town_Range”, these are: T42NR36W4, T41NR33W1, T47NR47W2, T47NR47W3, T47NR48W1, and T48NR48W3.

Projected Town-Range (TR) Block layer:

Because of some of the known issues with data collection, it may be prudent to use a more conservative grid framework when conducting analysis of the BBA data. This would in effect move data activities from a finer scale to a more coarse representation. The new larger polygon is a town-range block representation where the town-range grid lines spread across the entire State of Michigan. This was created by running a dissolve process on the Town_Range data field values. Matching data checks were done. This new product data layer is provided in the final data set and is called “MichiganDNR_Breeding_Bird_Atlas_projected_TR_blocks_polygons ...” (available as both a ArcGIS Personal Database layer and an ESRI Shapefile)

Connecting the Observational Data in the Access database to GIS:

The geographic location component in the tabular data allows table cross-connection to the GIS polygon layer by using the town-range-block identifier of the BBA1 and BBA2 data set. By itself, neither GIS layer carries observational data and has no real utility other than representing the Breeding Bird Atlas block locations and component values (e.g., the PLSS township and range identifier, block ID value).

Anyone unfamiliar with setting up a connection between a tabular data file and a matching unique value in a field in a GIS layer, should consult ESRI's help documentation online (<http://www.esri.com>) or within the software, specifically materials regarding the "Join" or "Relate" command. This new Atlas Block layer is provided in the final data set, and is called "Michigan_BBA_Atlas_blocks_polygons ..." (both ArcGIS Personal Database layer and ESRI Shapefile format are provided). The GIS layer can be used to take a query from the tabular/relational data set of BBA-1-and(or)-2, and "join" or "relate" those data to the sample block polygons.

Facilitated Use at Larger Scales:

There are several known data issues at the BBA Block scale, which become less of an impact to data use if the scale of data use is changed from the BBA Block to a larger scale representation or a more generalized representation (e.g., township rather than Atlas block, presence/absence rather than relative abundance).

Town and range value fields were retained in the GIS data layer to allow for ease of aggregation of blocks in geographic analysis when necessary to balance data gaps or skewed data collection patterns. Similarly, a field identifying the County which makes up the majority of the block (for both the MDNR Breeding Bird Atlas Blocks and the projected Town-Range blocks GIS layers) allows a non-duplicated representation of County membership of specific blocks. These two field identifications allow the data at the BBA Block level to be more easily aggregated up to a larger scale representation.

Data users can reach the TR-block-level data using either the Access tabular data field (or only working with the tabular data) or use the "TownRange" field in either GIS layer.

See [Section 6.6 comments](#) for technical details on produced files, sizes in bytes, exact file names, and more.

- (2.5.2.d.2) Sources_Used_Citation_Abbreviation: Michigan PLSS
- (2.5.2.d.3) Process_Date: 2012
- (2.5.2.d.4) Process_Time: (not applicable, as over long period)
- (2.5.2.d.5) Source_Produced_Citation_Abbreviation: Michigan BBA GIS layers.
- (2.5.2.d.6) Process_Contact:
 - (2.5.2.d.6.1) Contact_Person_Primary
 - (2.5.2.d.6.1.1) Contact_Person: Marshall Strong (but recommend using the contact position and contact organization, listed below)
 - (2.5.2.d.6.1.2) Contact_Organization: State of Michigan, Department of Natural Resources, Wildlife Division
 - (2.5.2.d.6.2) Contact_Organization_Primary: State of Michigan, Department of Natural Resources, Wildlife Division
 - (2.5.2.d.6.3) Contact_Position: MDNR Wildlife Division Mapping and Geotechnology Program Specialist
 - (2.5.2.d.6.4) Contact_Address:
 - (2.5.2.d.6.4.1) Address_Type: mailing address
 - (2.5.2.d.6.4.2) Address: P.O. Box 30444
 - (2.5.2.d.6.4.3) City: Lansing
 - (2.5.2.d.6.4.4) State_or_Province: MI
 - (2.5.2.d.6.4.5) Postal_Code (ZIP or ZIP+): 48909-7944

- (2.5.2.d.6.4.6) Country: United States of America
 - (2.5.2.d.6.5) Contact_Voice_Telephone: 1-517-284-9453
 - (2.5.2.d.6.6) Contact_TDD/TTY_Telephone: 711 (Michigan Relay Center)
 - (2.5.2.d.6.7) Contact_Facsimile_Telephone: 1-517-373-9566
 - (2.5.2.d.6.8) Contact_Electronic_Mail_Address: DNR-Wildlife@michigan.gov ; Those interested can also see the MDNR website online at <http://www.michigan.gov/dnr> for more information.
 - (2.5.2.d.6.9) Hours_of_Service: recommended Universal / GMT 12noon to 8pm or United States Eastern Standard Time 8am to 5pm
 - (2.5.2.d.6.10) Contact_Instructions: No significant instructions, other than: (a.) Please have patience as it may take a couple of days to reply back to questions, depending on the methods used (email, etc.) to contact our organization, (b.) please refer to this data set by its proper name of “Michigan Breeding Bird Atlas data set” or other relevant details, in any message or with questions.
- (2.5.2.2) Sources_Used_Citation_Abbreviation: Citations are included, where appropriate, within the earlier sub-process steps.
 - (2.5.2.3) Process_Date: 2011-2012 (to October 2012, or date of this publication)
 - (2.5.2.4) Process_Time: (not applicable, as over long period)
 - (2.5.2.5) Source_Produced_Citation_Abbreviation:
Michigan Breeding Bird Atlas Data set (the combination BBA-1-and-2 set)
 - (2.5.2.6) Process_Contact:
 - (2.5.2.6.1) Contact_Person_Primary:
 - (2.5.2.6.1.1) Contact_Person: Karen Cleveland (but recommend using the contact position and contact organization, listed below)
 - (2.5.2.6.1.2) Contact_Organization: State of Michigan, Department of Natural Resources, Wildlife Division
 - (2.5.2.6.2) Contact_Organization_Primary: State of Michigan, Department of Natural Resources, Wildlife Division
 - (2.5.2.6.3) Contact_Position: MDNR Wildlife Division’s All Bird Biologist
 - (2.5.2.6.4) Contact_Address:
 - (2.5.2.6.4.1) Address_Type: mailing address
 - (2.5.2.6.4.2) Address: P.O. Box 30444
 - (2.5.2.6.4.3) City: Lansing
 - (2.5.2.6.4.4) State_or_Province: MI
 - (2.5.2.6.4.5) Postal_Code (ZIP or ZIP+): 48909-7944
 - (2.5.2.6.4.6) Country: United States of America
 - (2.5.2.6.5) Contact_Voice_Telephone: 1-517-284-9453
 - (2.5.2.6.6) Contact_TDD/TTY_Telephone: 711 (Michigan Relay Center)
 - (2.5.2.6.7) Contact_Facsimile_Telephone: 1-517-373-9566
 - (2.5.2.6.8) Contact_Electronic_Mail_Address: DNR-Wildlife@michigan.gov ; Those interested can also see the MDNR website online at <http://www.michigan.gov/dnr> for more information.
 - (2.5.2.6.9) Hours_of_Service: recommended Universal / GMT 12noon – 8pm or United States Eastern Standard Time 8am – 5pm
 - (2.5.2.6.10) Contact_Instructions: No significant instructions, other than: (a.) Please have patience as it may take a couple of days to reply back to questions, depending on the methods used (email, etc.) to contact our organization, (b.) please refer to this data set by its proper name of “Michigan Breeding Bird Atlas data set” or other relevant details, in any message or with questions.

Section 3. Spatial Data Organization Information

(3) Spatial_Data_Organization_Information:

(3.1) Indirect_Spatial_Reference: State of Michigan (official extent of Michigan, USA)

(3.2) Direct_Spatial_Reference_Method: Vector

(3.3) Point_and_Vector_Object_Information:

(3.3.1) SDTS_Terms_Description:

For the Breeding Bird Atlas Block Layer:

(3.3.1.a.1) SDTS_Point_and_Vector_Object_Type: vector (network or irregular grid created from point and vector system)

(3.3.1.a.2) Point_and_Vector_Object_Count: 34615

(3.3.1.a.3) Object_Type: composite

(3.3.1.a.4) Object_Count: 11199

(3.3.1.a.5) Object_Type: polygon

(3.3.1.a.6) Object_Count: 11199

For the Breeding Bird Atlas Projected TR Block Layer:

(3.3.1.b.1) SDTS_Point_and_Vector_Object_Type: network or irregular grid created from point and vector system

(3.3.1.b.2) Point_and_Vector_Object_Count: 11473

(3.3.1.b.3) Object_Type: composite

(3.3.1.b.4) Object_Count: 2893

(3.3.1.b.5) Object_Type: polygon

(3.3.1.b.6) Object_Count: 2893

For the Breeding Bird Atlas Block Outline Layer:

(3.3.1.c.1) SDTS_Point_and_Vector_Object_Type: polygon

(3.3.1.c.2) Point_and_Vector_Object_Count: 24

(3.3.1.c.3) Object_Type: composite

(3.3.1.c.4) Object_Count: 1

(3.3.1.c.5) Object_Type: polygon

(3.3.1.c.6) Object_Count: 1

(3.4) Raster_Object_Information: (not applicable).

Section 4. Spatial Reference Information

(4.) Spatial_Reference_Information:

(4.1) Horizontal_Coordinate_System_Definition:

(4.1.1) Geographic: (not applicable).

(4.1.2) Planar:

(4.1.2.1) Map_Projection:

(4.1.2.1.1) Map_Projection_Name: Oblique Mercator (also know as Hotine Oblique Mercator Azimuth Natural Origin or NAD 1983 Hotine Oblique Mercato Azimuth Natural Origin)

(4.1.2.1.2 to 4.1.2.1.12 are not applicable)

(4.1.2.1.13) Oblique_Mercator:

(4.1.2.1.14 to 4.1.2.1.22 are not applicable)

(4.1.2.1.23) Map_Projection Parameters: (assembled in FDGC order)

(4.1.2.1.23.1 to 4.1.2.1.23.9 are not applicable)

(4.1.2.1.23.10) Scale_Factor_at_Center_Line: 0.9996

(4.1.2.1.23.11) Oblique_Line_Azimuth:

(4.1.2.1.23.11.1) Azimuthal_Angle: 337.25556

(4.1.2.1.23.11.2) Azimuth_Measure_Point_Longitude: -86.00000000

(4.1.2.1.23.3) Latitude_of_Projection_Origin: 45 18 33 N

(4.1.2.1.23.4) False_Easting: 2546731.496

(4.1.2.1.23.5) False_Northing: -4354009.816

Map_Projection_Comments: Additional detailed specifications, graphics, and discussion of this projection, the Michigan Georeference Projection (MGR), are available from the Michigan Geographic Data Library, online at <http://www.mcgi.state.mi.us/mgdl/?rel=thext&action=thmname&cid=10&cat=Public+Land+Survey+Sections> .

(4.1.2.4) Planar_Coordinate_Information:

(4.1.2.4.1) Planar_Coordinate_Encoding_Method: coordinate pair

(4.1.2.4.2) Coordinate_Representation:

(4.1.2.4.2.1) Abscissa_Resolution: 0.002048

(4.1.2.4.2.2) Ordinate_Resolution: 0.002048

(4.1.2.4.4) Planar_Distance_Units: meters

(4.1.4) Geodetic_Model:

(4.1.4.1) Horizontal_Datum_Name: North American Datum of 1983 (NAD83)

(4.1.4.2) Ellipsoid_Name: spheroid: Geodetic Reference System 80 (GRS_1980)

(4.1.4.3) Semi-major_Axis: 6378137.000000

Semi-minor_Axis: 6356752.314140356

(4.1.4.4) Denominator_of_Flattening_Ratio: Inverse Flattening: 298.257222

Supplemental_Geodetic_Model_Information:

Geographic_Coordinate_Sytem: GCS North American 1983;

Prime_Meridian: Greenwich (0.0);

Angular_Unit: Degree (0.0174532925199433).

Section 5. Entity and Attribute Information

(5.) Entity_and_Attribute_Information:

Comment1: This documentation and metadata detail a set of dependant and interrelated tables in two formats of tabular (relational data base) and geographic information system files. Because of the complete interdependence of these data, decision was to create a single official metadata file and thereby ensure technical details remain together for the potential future users of these data.

Table 12: Summary of Section 5, Entity and Attribute Sections in data files:

See [Section 6.6 comments](#) for technical details, size in bytes, exact file names and more.

subject or table name section

<u>Microsoft Access data base tables:</u>	(starts in Section 5.1)
COLLECTED FIELD OBSERVATION INFORMATION	
Filename: MichiganDNR_MI-BBA1n2combo_data_set_-_public_release_-_MS-Access_v2016.mdb or MichiganDNR_MI-BBA1n2combo_data_set_-_public_release_-_MS-Access_v2016.accdb	
TABLE#Projects	5.1
TABLE#Participants	
(note: this is a protected volunteer-information data table, kept internal only)	5.2
TABLE#CountyCoordinators	
(note this is a protected volunteer-information data table, kept internal only)	5.3
TABLE#Counties	5.4
TABLE#BreedingCodes	5.5
TABLE#ProjectBlocks	5.6
TABLE#SurveyBlocks	5.7
TABLE#SurveyForms	5.8
TABLE#BirdObservations	5.9
TABLE#Taxonomy	5.10
TABLE#ObsoleteTaxonomy	5.11

GIS-related data layers and tables: (starts in Section [5.12](#))

FRAMEWORK FOR SPATIAL DISPLAY OF	
COLLECTED OBSERVATION INFORMATION (above)	
Filename: MichiganDNR_Breeding_Bird_Atlas_GIS_data.mdb	
or 3 shapefiles of:	MichiganDNR_BBA_Atlas_area_outline_polygon.shp / etc. MichiganDNR_BBA_Atlas_Blocks_polygons.shp / etc. MichiganDNR_BBA_projected_TR_blocks_polygons.shp / etc. (See Section 6.6 comments for technical details on shapefiles).
GIS Layer "Breeding Bird Atlas Block Layer" attribute table.	5.12
GIS Layer "Breeding Bird Atlas Projected TR Block Layer" attribute table.	5.13
GIS Layer "Breeding Bird Atlas Block Outline Layer" attribute table.	5.14

Comment2: Start the COLLECTED FIELD OBSERVATION INFORMATION

(5.1) Overview_Description: **PROJECT (BBA1 or BBA2) COLLECTED OBSERVATION INFORMATION** (see Entity_Type_Definition in Section 5.1.1.2)

(5.1.1) Entity_Type: table

(5.1.1.1) Entity_Type_Label: TABLE#Projects

- (5.1.1.2) Entity_Type_Definition: table; a Microsoft Access database table which contains general information about the bird atlas projects whose data is stored in the database. The table consists of the atlas project's name and a unique identifier for each project. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set.
- (5.1.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project
- Entity_Type_Comment: This is collected field observation information.
- (5.1.2) Attribute:
 - (5.1.2.1) Attribute_Label: TABLE#Projects.ProjectID_longint
 - (5.1.2.2) Attribute_Label_Definition: primary key of the TABLE#Projects table. This value is a sequentially assigned long integer value.
 - (5.1.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (Note: This key field is new and was not in the BBA1, BBA2 or KNC database products.)
 - (5.1.2.4) Attribute_Domain_Values:
 - (5.1.2.4.1) Enumerated_Domain: (not applicable).
 - (5.1.2.4.2) Range_Domain:
 - (5.1.2.4.2.1) Range_Domain_Minimum: 1
 - (5.1.2.4.2.2) Range_Domain_Maximum: 2
 - (5.1.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.1.3) Attribute:
 - (5.1.3.1) Attribute_Label: TABLE#Projects.ProjectName_text5
 - (5.1.3.2) Attribute_Label_Definition: The abbreviated name by which the project is identified.
 - (5.1.3.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project
 - (5.1.3.4) Attribute_Domain_Values: MDNR
 - (5.1.3.4.1) Enumerated_Domain:
 - (5.1.3.4.1.1) Enumerated_Domain_Value: BBA1 or BBA2
 - (5.1.3.4.1.2) Enumerated_Domain_Value_Definition: represents data collected during Michigan Breeding Bird Atlas One (if BBA1) or Two (if BBA2).
 - (5.1.3.4.1.2) Enumerated_Domain_Value_Source: MDNR
 - * Enumerated_Domain_Value:
Enumerated_Domain_Value: BBA1
Enumerated_Domain_Value_Definition: represents data collected during Michigan Breeding Bird Atlas One.
 - * Enumerated_Domain_Value:
Enumerated_Domain_Value: BBA2
Enumerated_Domain_Value_Definition: represents data collected during Michigan Breeding Bird Atlas Two.
- (5.2) Overview_Description: **COLLECTED FIELD OBSERVER INFORMATION** (see Entity_Type_Definition in Section 5.2.1.2)
- (5.2.1) Entity_Type: table
 - (5.2.1.1) Entity_Type_Label: TABLE#Participants
 - (5.2.1.2) Entity_Type_Definition: table; a Microsoft Access database table which contains observer details for those who worked on the project with Kalamazoo Nature Center, Kalamazoo, Michigan, USA. The table consists of the observer's submitted personal contact information and other related details which were

provided during project observations, collections and data submission. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set. Note: This table is not included in the publicly available version of the MDNR Wildlife Division Combo-BBA1-2 Project data set.

(5.2.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project

Entity_Type_Comment: Confidential and protected personal information provided by volunteers; not for distribution.

(5.2.2) Attribute:

(5.2.2.1) Attribute_Label: TABLE#Participants.ParticipantID_longint

(5.2.2.2) Attribute_Label_Definition: primary key of the TABLE#Participants table. This value is a sequentially assigned long integer value.

(5.2.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (Note: This key field is new and was not in the BBA1, BBA2 or KNC database products.)

(5.2.2.4) Attribute_Domain_Values:

(5.2.2.4.1) Enumerated_Domain: (not applicable).

(5.2.2.4.2) Range_Domain:

(5.2.2.4.2.1) Range_Domain_Minimum: 1

(5.2.2.4.2.2) Range_Domain_Maximum: 610

(5.2.2.5) Attribute_Units_of_Measure: natural / whole interger numbers, positive values.

(5.2.3) Attribute:

(5.2.3.1) Attribute_Label: TABLE#Participants.OrganizationName_text50

(5.2.3.2) Attribute_Label_Definition: When records were created for an organization, or representative of an organization, the full name of the organization, and as per the accepted conventions of names within USPS standards.

(5.2.3.3) Attribute_Definition_Source: USPS. 2010. United States of America (USA) Postal Service (USPS) Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number (PSN) 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.

(5.2.3.4) Attribute_Domain_Values:

(5.2.3.4.1) Enumerated_Domain: (not applicable).

(5.2.3.4.2) Range_Domain: (not applicable).

(5.2.3.4.3) Codeset_Domain: (not applicable).

(5.2.3.4.4) Unrepresentable_Domain: free text information.

(5.2.4) Attribute:

(5.2.4.1) Attribute_Label: TABLE#Participants.ParticipantTitle_text4

(5.2.4.2) Attribute_Label_Definition: The title by which the observer associated with the ParticipantID_longint is socially addressed as per the accepted conventions of address information.

(5.2.4.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.

(5.2.4.4) Attribute_Domain_Values:

(5.2.4.4.1) Enumerated_Domain:

(5.2.4.4.1.1) Enumerated_Domain_Value: (Specific values are listed below.)

- (5.2.4.4.1.2) Enumerated_Domain_Value_Definition: The value definition is different for each value as listed below.
- * Enumerated_Domain:
Enumerated_Domain_Value: Mr.
Enumerated_Domain_Value_Definition: Mister
 - * Enumerated_Domain:
Enumerated_Domain_Value: Mrs.
Enumerated_Domain_Value_Definition: Missus (or Missis)
 - * Enumerated_Domain:
Enumerated_Domain_Value: Miss
Enumerated_Domain_Value_Definition: Miss
 - * Enumerated_Domain:
Enumerated_Domain_Value: Ms.
Enumerated_Domain_Value_Definition: Ms.
 - * Enumerated_Domain:
Enumerated_Domain_Value: Dr.
Enumerated_Domain_Value_Definition: Doctor
- (5.2.5) Attribute:
- (5.2.5.1) Attribute_Label: TABLE#Participants.ParticipantFName_text25
 - (5.2.5.2) Attribute_Definition: The given name of the observer associated with the ParticipantID_longint as provided by the observer to Kalamazoo Nature Center personnel as per the accepted conventions of address information.
 - (5.2.5.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.2.5.4) Attribute_Domain_Values:
 - (5.2.5.4.1) Enumerated_Domain: (not applicable).
 - (5.2.5.4.2) Range_Domain: (not applicable).
 - (5.2.5.4.3) Codeset_Domain: (not applicable).
 - (5.2.5.4.4) Unrepresentable_Domain: free text information.
- (5.2.6) Attribute:
- (5.2.6.1) Attribute_Label: TABLE#Participants.ParticipantMI_text25
 - (5.2.6.2) Attribute_Definition: The middle name or initial of the observer associated with the ParticipantID_longint as provided to Kalamazoo Nature Center personnel as per the accepted conventions of address information.
 - (5.2.6.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.2.6.4) Attribute_Domain_Values:
 - (5.2.6.4.1) Enumerated_Domain: (not applicable).
 - (5.2.6.4.2) Range_Domain: (not applicable).
 - (5.2.6.4.3) Codeset_Domain: (not applicable).
 - (5.2.6.4.4) Unrepresentable_Domain: free text information.
- (5.2.7) Attribute:
- (5.2.7.1) Attribute_Label: TABLE#Participants.ParticipantLName_text25
 - (5.2.7.2) Attribute_Definition: The surname of the observer associated with the ParticipantID_longint as provided to Kalamazoo Nature Center personnel as per the accepted conventions of address information.

- (5.2.7.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
- (5.2.7.4) Attribute_Domain_Values:
 - (5.2.7.4.1) Enumerated_Domain: (not applicable).
 - (5.2.7.4.2) Range_Domain: (not applicable).
 - (5.2.7.4.3) Codeset_Domain: (not applicable).
 - (5.2.7.4.4) Unrepresentable_Domain: free text information.
- (5.2.8) Attribute:
 - (5.2.8.1) Attribute_Label: TABLE#Participants.HomePhone_text12
 - (5.2.8.2) Attribute_Definition: The telephone number with area code provided by the observer for contact at home.
 - (5.2.8.3) Attribute_Definition_Source: NAPSTN. 2011. North American Public Switched Telephone Network (PSTN) guidelines and TSB-ITU E.164 guidelines for telecommunications numbering, revised January 2011. Telecommunication Standardization Bureau (TSB) of the International Telecommunication Unit (ITU), United Nations (UN), UN Headquarters, New York City, New York, USA. Online at <http://www.itu.int/>. Accessed 11 October 2012.
 - (5.2.8.4) Attribute_Domain_Values:
 - (5.2.8.4.1) Enumerated_Domain: (not applicable).
 - (5.2.8.4.2) Range_Domain: (not applicable).
 - (5.2.8.4.3) Codeset_Domain: (not applicable).
 - (5.2.8.4.4) Unrepresentable_Domain: 10 natural interger numbers with text characters in the format: ###-###-####, may be null value.
- (5.2.9) Attribute:
 - (5.2.9.1) Attribute_Label: TABLE#Participants.CellPhone_text12
 - (5.2.9.2) Attribute_Definition: The cell phone number with area code provided by the observer for contact.
 - (5.2.9.3) Attribute_Definition_Source: NAPSTN. 2011. North American Public Switched Telephone Network guidelines and TSB-ITU E.164 guidelines for telecommunications numbering, revised January 2011. Telecommunication Standardization Bureau of the International Telecommunication Unit, United Nations, UN Headquarters, New York City, New York, USA. Online at <http://www.itu.int/>. Accessed 11 October 2012.
 - (5.2.9.4) Attribute_Domain_Values:
 - (5.2.9.4.1) Enumerated_Domain: (not applicable).
 - (5.2.9.4.2) Range_Domain: (not applicable).
 - (5.2.9.4.3) Codeset_Domain: (not applicable).
 - (5.2.9.4.4) Unrepresentable_Domain: 10 natural numbers with text characters in the format: ###-###-####, may be null value.
- (5.2.10) Attribute:
 - (5.2.10.1) Attribute_Label: TABLE#Participants.WorkPhone_text12
 - (5.2.10.2) Attribute_Definition: The work phone number provided by the observer for contact.
 - (5.2.10.3) Attribute_Definition_Source: NAPSTN. 2011. North American Public Switched Telephone Network guidelines and TSB-ITU E.164 guidelines for telecommunications numbering, revised January 2011. Telecommunication Standardization Bureau of the International Telecommunication Unit, United Nations, UN Headquarters, New York City, New York, USA. Online at <http://www.itu.int/>. Accessed 11 October 2012.

- (5.2.10.4) Attribute_Domain_Values:
 - (5.3.10.4.1) Enumerated_Domain: (not applicable).
 - (5.3.10.4.2) Range_Domain: (not applicable).
 - (5.3.10.4.3) Codeset_Domain: (not applicable).
 - (5.3.10.4.4) Unrepresentable_Domain: 10 natural interger numbers with text characters in the format: ###-###-#####, may be null value.
- (5.2.11) Attribute:
 - (5.2.11.1) Attribute_Label: TABLE#Participants.WorkPhoneExtension_text6
 - (5.2.11.2) Attribute_Definition: The extension necessary to reach the observer at the work number provided, where applicable.
 - (5.2.11.3) Attribute_Definition_Source: NAPSTN. 2011. North American Public Switched Telephone Network guidelines and TSB-ITU E.164 guidelines for telecommunications numbering, revised January 2011. Telecommunication Standardization Bureau of the International Telecommunication Unit, United Nations, UN Headquarters, New York City, New York, USA. Online at <http://www.itu.int/>. Accessed 11 October 2012.
 - (5.2.11.4) Attribute_Domain_Values:
 - (5.2.11.4.1) Enumerated_Domain: (not applicable).
 - (5.2.11.4.2) Range_Domain: (not applicable).
 - (5.2.11.4.3) Codeset_Domain: (not applicable).
 - (5.2.11.4.4) Unrepresentable_Domain: natural interger numbers of varying lengths, may be null value.
 - (5.2.11.5) Attribute_Units_of_Measure: natural / whole interger numbers, positive values.
- (5.2.12) Attribute:
 - (5.2.12.1) Attribute_Label: TABLE#Participants.Fax_text12
 - (5.2.12.2) Attribute_Definition: The fax number provided by the observer for contact.
 - (5.2.12.3) Attribute_Definition_Source: NAPSTN. 2011. North American Public Switched Telephone Network guidelines and TSB-ITU E.164 guidelines for telecommunications numbering, revised January 2011. Telecommunication Standardization Bureau of the International Telecommunication Unit, United Nations, UN Headquarters, New York City, New York, USA. Online at <http://www.itu.int/>. Accessed 11 October 2012.
 - (5.2.12.4) Attribute_Domain_Values:
 - (5.3.12.4.1) Enumerated_Domain: (not applicable).
 - (5.3.12.4.2) Range_Domain: (not applicable).
 - (5.3.12.4.3) Codeset_Domain: (not applicable).
 - (5.3.12.4.4) Unrepresentable_Domain: 10 natural interger numbers with text characters in the format: ###-###-#####, may be null value.
- (5.2.13) Attribute:
 - (5.2.13.1) Attribute_Label: TABLE#Participants.MailAddress1_text50
 - (5.2.13.2) Attribute_Definition: The first line in the mailing address for the observer (e.g., street number, direction, name, and type; organizational subunit; office or building name) as per the accepted conventions of address information.
 - (5.2.13.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.2.13.4) Attribute_Domain_Values:
 - (5.2.13.4.1) Enumerated_Domain: (not applicable).

- (5.2.13.4.2) Range_Domain: (not applicable).
- (5.2.13.4.3) Codeset_Domain: (not applicable).
- (5.2.13.4.4) Unrepresentable_Domain: mixed numeric and text characters
- (5.2.14) Attribute:
 - (5.2.14.1) Attribute_Label: TABLE#Participants.MailAddress2_text50
 - (5.2.14.2) Attribute_Definition: The second line in the mailing address for the observer (e.g., street number, direction, name, and type; organizational subunit; office or building name if necessary for delivery by the postal system) as per the accepted conventions of address information.
 - (5.2.14.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.2.14.4) Attribute_Domain_Values:
 - (5.2.14.4.1) Enumerated_Domain: (not applicable).
 - (5.2.14.4.2) Range_Domain: (not applicable).
 - (5.2.14.4.3) Codeset_Domain: (not applicable).
 - (5.2.14.4.4) Unrepresentable_Domain: mixed numeric and text characters
- (5.2.15) Attribute:
 - (5.2.15.1) Attribute_Label: TABLE#Participants.MailCity_text50
 - (5.2.15.2) Attribute_Definition: The city associated with the observer's mailing address as per the accepted conventions of address information.
 - (5.2.15.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.2.15.4) Attribute_Domain_Values:
 - (5.2.15.4.1) Enumerated_Domain: (not applicable).
 - (5.2.15.4.2) Range_Domain: (not applicable).
 - (5.2.15.4.3) Codeset_Domain: (not applicable).
 - (5.2.15.4.4) Unrepresentable_Domain: free text information.
- (5.2.16) Attribute:
 - (5.2.16.1) Attribute_Label: TABLE#Participants.MailState_text2
 - (5.2.16.2) Attribute_Definition: The abbreviation for the State or Canadian province associated with the observer's mailing address as per the accepted conventions of address information.
 - (5.2.16.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.2.16.4) Attribute_Domain_Values:
 - (5.2.16.4.1) Enumerated_Domain: (not applicable).
 - (5.2.16.4.2) Range_Domain: (not applicable).
 - (5.2.16.4.3) Codeset_Domain:
 - (5.2.16.4.3.1) Codeset_Name: State Abbreviations
 - (5.2.16.4.3.2) Codeset_Source: Standard abbreviations for postal delivery. <https://www.usps.com/send/official-abbreviations.htm>; Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards,

revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>. A few participants supplied residence information in Canada, but the USPS standard has directions and provisions for international abbreviations and coding; Canadian codes provided by the Canadian Postal Service, online at <http://www.canadapost.ca/tools/pg/manual/PGaddress-e.asp#1380608>, Accessed 30 October 2012.

(5.2.17) Attribute:

(5.2.17.1) Attribute_Label: TABLE#Participants.MailZip_text10

(5.2.17.2) Attribute_Definition: The standard five digit ZIP-Code used for US postal delivery, nine digit Zip+4 code used for US postal deliver, or six character alphanumeric postal code used for Canadian postal delivery and as per the accepted conventions of address information.

(5.2.17.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>. A few participants supplied residence information in Canada, but the USPS standard has directions and provisions for international abbreviations and coding; Canadian codes provided by the Canadian Postal Service, online at <http://www.canadapost.ca/tools/pg/manual/PGaddress-e.asp#1380608>, Accessed 30 October 2012.

(5.2.17.4) Attribute_Domain_Values:

(5.2.17.4.1) Enumerated_Domain: (not applicable).

(5.2.17.4.2) Range_Domain: (not applicable).

(5.2.17.4.3) Codeset_Domain:

(5.3.17.4.3.1) Codeset_Name: US Zip Code

(5.3.17.4.3.2) Codeset_Source: Standard abbreviations for postal delivery. <https://www.usps.com/send/official-abbreviations.htm>; Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>. A few participants supplied residence information in Canada, but the USPS standard has directions and provisions for international abbreviations and coding; Canadian codes provided by the Canadian Postal Service, online at <http://www.canadapost.ca/tools/pg/manual/PGaddress-e.asp#1380608>, Accessed 30 October 2012.

(5.2.17.5) Attribute_Units_of_Measure: natural / whole interger numbers, positive values; typically 5, or may be 9 values if “zip+” 5 with an additional 4 digits after a dash line

(5.2.18) Attribute:

(5.2.18.1) Attribute_Label: TABLE#Participants.Email_text40

(5.2.18.2) Attribute_Definition: The email address for the observer associated with the ParticipantID_longint

(5.2.18.3) Attribute_Definition_Source: IETF. 2012. Official Internet Protocol Standards. Internet Engineering Task Force (IETF), online at <http://www.ietf.org>. STD1. Online at <http://www.ietf.org/about/standards-process.html>. Accessed 11 October 2012.

- (5.2.18.4) Attribute_Domain_Values:
 - (5.2.18.4.1) Enumerated_Domain: (not applicable).
 - (5.2.18.4.2) Range_Domain: (not applicable).
 - (5.2.18.4.3) Codeset_Domain: (not applicable).
 - (5.2.18.4.4) Unrepresentable_Domain: mixed text and/or numeric characters with special character “@”, may be null value.
- (5.2.19) Attribute:
 - (5.2.19.1) Attribute_Label: TABLE#Participants.Notes_memo
 - (5.2.19.2) Attribute_Definition: A free comment or text field to provide any additional details about the observer’s atlas functions.
 - (5.2.19.3) Attribute_Definition_Source: Kalamazoo Nature Center, Kalamazoo, Michigan; online at <http://naturecenter.org/>.
 - (5.2.19.4) Attribute_Domain_Values:
 - (5.2.19.4.1) Enumerated_Domain: (not applicable).
 - (5.2.19.4.2) Range_Domain: (not applicable).
 - (5.2.19.4.3) Codeset_Domain: (not applicable).
 - (5.2.19.4.4) Unrepresentable_Domain: free text information.
- (5.2.20) Attribute:
 - (5.2.20.1) Attribute_Label: TABLE#Participants.FoiaID_longint
 - (5.2.20.2) Attribute_Label_Definition: A unique identifier for each participant in the Breeding Bird Atlas projects. This field is distinct from the primary key value in TABLE#Participants.ParticipantID_longint, contains a quasirandom value, and can be used to distinguish between individual participants in publicly released data sets while remaining compliant with Michigan Freedom of Information Act privacy protections. This value is a sequentially assigned long integer value, created by MDNR Wildlife Division, and related to provisions to allow removal of protected personal information from the publically-accessible version of the MDNR Wildlife Division Combo-BBA1-2 Project data set.
 - (5.2.20.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project
 - (Note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.2.20.4) Attribute_Domain_Values:
 - (5.2.20.4.1) Enumerated_Domain: (not applicable).
 - (5.2.20.4.2) Range_Domain:
 - (5.2.20.4.2.1) Range_Domain_Minimum: 1
 - (5.2.20.4.2.2) Range_Domain_Maximum: 610
 - (5.2.20.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.3) Overview_Description: **COLLECTED FIELD OBSERVATION INFORMATION FOR COUNTY COORDINATORS** (see Entity_Type_Definition in Section 5.3.1.2)
- (5.3.1) Entity_Type: table
 - (5.3.1.1) Entity_Type_Label: TABLE#CountyCoordinators
 - (5.3.1.2) Entity_Type_Definition: table; a Microsoft Access database table which contains information regarding the individuals assigned/volunteered to act as a volunteer coordinator for a county or region in one of the Breeding Bird Atlas projects. The table consists of the coordinator’s ParticipantID, county(ies) coordinated, and date range during which the individual was a coordinator. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set. (Note: This table is not

- included in the publicly available version of the MDNR Wildlife Division Combo-BBA1-2 Project data set.)
- (5.3.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project
Entity_Type_Comment: confidential and protected personal information provided by volunteers; not for distribution.
- (5.3.2) Attribute:
(5.3.2.1) Attribute_Label: TABLE#CountyCoordinators.CoordinationID_longint
(5.3.2.2) Attribute_Label_Definition: primary key of the TABLE#CountyCoordinators table. This value is a sequentially assigned long integer value.
(5.3.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project
(Note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
(5.3.2.4) Attribute_Domain_Values:
(5.3.2.4.1) Enumerated_Domain: (not applicable).
(5.3.2.4.2) Range_Domain:
(5.3.2.4.2.1) Range_Domain_Minimum: 1
(5.3.2.4.2.2) Range_Domain_Maximum: 53
(5.3.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.3.3) Attribute:
(5.3.3.1) Attribute_Label: TABLE#CountyCoordinators.CountyID_longint
(5.3.3.2) Attribute_Label_Definition: Foreign key from table TABLE#Counties; references the Michigan county being described.
(5.3.3.3) Attribute_Label_Definition_Source: TABLE#Counties
(5.3.3.4) Attribute_Domain_Values:
(5.3.3.4.1) Enumerated_Domain: (not applicable).
(5.3.3.4.2) Range_Domain:
(5.3.3.4.2.1) Range_Domain_Minimum: 1
(5.3.3.4.2.2) Range_Domain_Maximum: 83
(5.3.3.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.3.4) Attribute:
(5.3.4.1) Attribute_Label: TABLE#CountyCoordinators.CoordinatorID_longint
(5.3.4.2) Attribute_Label_Definition: Foreign key from table TABLE#Participants; references the individual acting as a county/regional coordinator.
(5.3.4.3) Attribute_Label_Definition_Source: TABLE#Participants
(5.3.4.4) Attribute_Domain_Values:
(5.3.4.4.1) Enumerated_Domain: (not applicable).
(5.3.4.4.1) Range_Domain:
(5.3.4.4.1.1) Range_Domain_Minimum: 1
(5.3.4.4.1.2) Range_Domain_Maximum: 610
(5.3.4.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.3.5) Attribute:
(5.3.5.1) Attribute_Label: TABLE#CountyCoordinators.StartDate_meddate
(5.3.5.2) Attribute_Label_Definition: The date on which the individual was assigned as the coordinator for the county/region.
(5.3.5.3) Attribute_Label_Definition_Source: Kalamazoo Nature Center, Kalamazoo, Michigan; online at <http://naturecenter.org/>.

- (5.3.5.4) Attribute_Domain_Values:
 - (5.3.5.4.1) Enumerated_Domain: (not applicable).
 - (5.3.5.4.2) Range_Domain: (not applicable).
 - (5.3.5.4.3) Codeset_Domain: (not applicable).
 - (5.3.5.4.4) Unrepresentable_Domain: medium date format
- (5.3.6) Attribute:
 - (5.3.6.1) Attribute_Label: TABLE#CountyCoordinators.EndDate_meddate
 - (5.3.6.2) Attribute_Label_Definition: The date on which the individual was removed/resigned as the coordinator for the county/region.
 - (5.3.6.3) Attribute_Label_Definition_Source: Kalamazoo Nature Center, Kalamazoo, Michigan; online at <http://naturecenter.org/>.
 - (5.3.6.4) Attribute_Domain_Values:
 - (5.3.6.4.1) Enumerated_Domain: (not applicable).
 - (5.3.6.4.2) Range_Domain: (not applicable).
 - (5.3.6.4.3) Codeset_Domain: (not applicable).
 - (5.3.6.4.4) Unrepresentable_Domain: medium date format
- (5.4) Overview_Description: **COLLECTED FIELD OBSERVATION INFORMATION FOR COUNTY** (see Entity_Type_Definition in Section 5.4.1.2)
 - (5.4.1) Entity_Type: table
 - (5.4.1.1) Entity_Type_Label: TABLE#Counties
 - (5.4.1.2) Entity_Type_Definition: Access table listing all counties in Michigan, their breeding bird atlas coordination region, and a crude assignment to ecoregion or Michigan region. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set.
 - (5.4.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.
 - (5.4.2) Attribute:
 - (5.4.2.1) Attribute_Label: TABLE#Counties.CountyID_longint
 - (5.4.2.2) Attribute_Label_Definition: Primary key of the TABLE#Counties table. This value is a sequentially assigned long integer value.
 - (5.4.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project
 - (Note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.4.2.4) Attribute_Domain_Values:
 - (5.4.2.4.1) Enumerated_Domain: (not applicable).
 - (5.4.2.4.2) Range_Domain:
 - (5.4.2.4.2.1) Range_Domain_Minimum: 1
 - (5.4.2.4.2.2) Range_Domain_Maximum: 83
 - (5.4.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
 - (5.4.3) Attribute:
 - (5.4.3.1) Attribute_Label: TABLE#Counties.CountyName_text15
 - (5.4.3.2) Attribute_Label_Definition: The political name of the county
 - (5.4.3.3) Attribute_Label_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.4.3.4) Attribute_Domain_Values:

(5.4.3.4.1) Enumerated_Domain:

(5.4.3.4.1.1) Enumerated_Domain_Value: 83 county names
(as follows:)

Enumerated_Domain_Value: Alcona
Enumerated_Domain_Value: Alger
Enumerated_Domain_Value: Allegan
Enumerated_Domain_Value: Alpena
Enumerated_Domain_Value: Antrim
Enumerated_Domain_Value: Arenac
Enumerated_Domain_Value: Baraga
Enumerated_Domain_Value: Barry
Enumerated_Domain_Value: Bay
Enumerated_Domain_Value: Benzie
Enumerated_Domain_Value: Berrien
Enumerated_Domain_Value: Branch
Enumerated_Domain_Value: Calhoun
Enumerated_Domain_Value: Cass
Enumerated_Domain_Value: Charlevoix
Enumerated_Domain_Value: Cheboygan
Enumerated_Domain_Value: Chippewa
Enumerated_Domain_Value: Clare
Enumerated_Domain_Value: Clinton
Enumerated_Domain_Value: Crawford
Enumerated_Domain_Value: Delta
Enumerated_Domain_Value: Dickinson
Enumerated_Domain_Value: Eaton
Enumerated_Domain_Value: Emmet
Enumerated_Domain_Value: Genesee
Enumerated_Domain_Value: Gladwin
Enumerated_Domain_Value: Gogebic
Enumerated_Domain_Value: Grand Traverse
Enumerated_Domain_Value: Gratiot
Enumerated_Domain_Value: Hillsdale
Enumerated_Domain_Value: Houghton
Enumerated_Domain_Value: Huron
Enumerated_Domain_Value: Ingham
Enumerated_Domain_Value: Ionia
Enumerated_Domain_Value: Iosco
Enumerated_Domain_Value: Iron
Enumerated_Domain_Value: Isabella
Enumerated_Domain_Value: Jackson
Enumerated_Domain_Value: Kalamazoo
Enumerated_Domain_Value: Kalkaska
Enumerated_Domain_Value: Kent
Enumerated_Domain_Value: Keweenaw
Enumerated_Domain_Value: Lake
Enumerated_Domain_Value: Lapeer
Enumerated_Domain_Value: Leelanau
Enumerated_Domain_Value: Lenawee
Enumerated_Domain_Value: Livingston
Enumerated_Domain_Value: Luce

Enumerated_Domain_Value: Mackinac
Enumerated_Domain_Value: Macomb
Enumerated_Domain_Value: Manistee
Enumerated_Domain_Value: Marquette
Enumerated_Domain_Value: Mason
Enumerated_Domain_Value: Mecosta
Enumerated_Domain_Value: Menominee
Enumerated_Domain_Value: Midland
Enumerated_Domain_Value: Missaukee
Enumerated_Domain_Value: Monroe
Enumerated_Domain_Value: Montcalm
Enumerated_Domain_Value: Montmorency
Enumerated_Domain_Value: Muskegon
Enumerated_Domain_Value: Newaygo
Enumerated_Domain_Value: Oakland
Enumerated_Domain_Value: Oceana
Enumerated_Domain_Value: Ogemaw
Enumerated_Domain_Value: Ontonagon
Enumerated_Domain_Value: Osceola
Enumerated_Domain_Value: Oscoda
Enumerated_Domain_Value: Otsego
Enumerated_Domain_Value: Ottawa
Enumerated_Domain_Value: Presque Isle
Enumerated_Domain_Value: Roscommon
Enumerated_Domain_Value: Saginaw
Enumerated_Domain_Value: Sanilac
Enumerated_Domain_Value: Schoolcraft
Enumerated_Domain_Value: Shiawassee
Enumerated_Domain_Value: St. Clair (if Saint is abbreviated)
Enumerated_Domain_Value: St. Joseph (if Saint is abbreviated)
Enumerated_Domain_Value: Tuscola
Enumerated_Domain_Value: Van Buren
Enumerated_Domain_Value: Washtenaw
Enumerated_Domain_Value: Wayne
Enumerated_Domain_Value: Wexford

(5.4.3.4.1.2) Enumerated_Domain_Value_Definition: County in Michigan.

(5.4.3.4.1.3) Enumerated_Domain_Value_Definition_Source: USPS.

(5.4.4) Attribute:

(5.4.4.1) Attribute_Label: TABLE#Counties.RegionNumber_byte

(5.4.4.2) Attribute_Label_Definition: A series of 26 sequentially numbered, from north to south, multi-county regions used to assign local staff to coordinate volunteer efforts, during BBA1 and used during BBA2.

(5.4.4.3) Attribute_Label_Definition_Source: BBA1 and BBA2

(5.4.4.4) Attribute_Domain_Values:

(5.4.4.4.1) Enumerated_Domain:

(5.4.4.4.1.1) Enumerated_Domain_Value: 1 through 26

(5.4.4.4.1.2) Enumerated_Domain_Value_Definition: the value definition is different for each value as listed below.

(5.4.4.4.1.3) Enumerated_Domain_Value_Definition_Source: BBA1 or BBA2 or both ... according to the county names used/defined by USPS. Note: as this is same source for all values, it is not repeated below.

(as follows:)

- * Enumerated_Domain:
Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition: a BBA1/BBA2 project region including the counties of Gogebic and Ontonagon
- * Enumerated_Domain:
Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition: a region including the counties of Iron, Baraga, Houghton, and Keweenaw
- * Enumerated_Domain:
Enumerated_Domain_Value: 3
Enumerated_Domain_Value_Definition: a region including the counties of Marquette, Dickinson, and Menominee
- * Enumerated_Domain:
Enumerated_Domain_Value: 4
Enumerated_Domain_Value_Definition: a region including the counties of Alger, Delta, and Schoolcraft
- * Enumerated_Domain:
Enumerated_Domain_Value: 5
Enumerated_Domain_Value_Definition: a region including the counties of Luce, Chippewa, and Mackinac
- * Enumerated_Domain:
Enumerated_Domain_Value: 6
Enumerated_Domain_Value_Definition: a region including the counties of Emmet, Cheboygan, Otsego, and Charlevoix
- * Enumerated_Domain:
Enumerated_Domain_Value: 7
Enumerated_Domain_Value_Definition: a region including the counties of Presque Isle, Montmorency, and Alpena
- * Enumerated_Domain:
Enumerated_Domain_Value: 8
Enumerated_Domain_Value_Definition: a region including the counties of Antrim, Grand Traverse, and Leelanau
- * Enumerated_Domain:
Enumerated_Domain_Value: 9
Enumerated_Domain_Value_Definition: a region including the counties of Benzie, Manistee, and Wexford
- * Enumerated_Domain:
Enumerated_Domain_Value: 10
Enumerated_Domain_Value_Definition: a region including the counties of Kalkaska, Crawford, Missaukee, and Roscommon
- * Enumerated_Domain:
Enumerated_Domain_Value: 11
Enumerated_Domain_Value_Definition: a region including the counties of Oscoda, Alcona, Ogemaw, and Iosco
- * Enumerated_Domain:
Enumerated_Domain_Value: 12
Enumerated_Domain_Value_Definition: a region including the counties of Mason, Lake, Oceana, and Newaygo
- * Enumerated_Domain:
Enumerated_Domain_Value: 13

- Enumerated_Domain_Value_Definition: a region including the counties of Osceola, Clare, Mecosta, and Isabella
- * Enumerated_Domain:
Enumerated_Domain_Value: 14
Enumerated_Domain_Value_Definition: a region including the counties of Gladwin, Arenac, Midland, and Bay
 - * Enumerated_Domain:
Enumerated_Domain_Value: 15
Enumerated_Domain_Value_Definition: a region including the counties of Muskegon, Ottawa, and Kent
 - * Enumerated_Domain:
Enumerated_Domain_Value: 16
Enumerated_Domain_Value_Definition: a region including the counties of Montcalm, Gratiot, and Ionia
 - * Enumerated_Domain:
Enumerated_Domain_Value: 17
Enumerated_Domain_Value_Definition: a region including the counties of Saginaw, Shiawassee, and Genesee
 - * Enumerated_Domain:
Enumerated_Domain_Value: 18
Enumerated_Domain_Value_Definition: a region including the counties of Huron, Tuscola, and Sanilac
 - * Enumerated_Domain:
Enumerated_Domain_Value: 19
Enumerated_Domain_Value_Definition: a region including the counties of Allegan, Barry, and Kalamazoo
 - * Enumerated_Domain:
Enumerated_Domain_Value: 20
Enumerated_Domain_Value_Definition: a region including the counties of Clinton, Eaton, and Ingham
 - * Enumerated_Domain:
Enumerated_Domain_Value: 21
Enumerated_Domain_Value_Definition: a region including the counties of Livingston and Oakland
 - * Enumerated_Domain:
Enumerated_Domain_Value: 22
Enumerated_Domain_Value_Definition: a region including the counties of Lapeer, St. Clair, and Macomb
 - * Enumerated_Domain:
Enumerated_Domain_Value: 23
Enumerated_Domain_Value_Definition: a region including the counties of Van Buren, Berrien, and Cass
 - * Enumerated_Domain:
Enumerated_Domain_Value: 24
Enumerated_Domain_Value_Definition: a region including the counties of Calhoun, St. Joseph, and Branch
 - * Enumerated_Domain:
Enumerated_Domain_Value: 25
Enumerated_Domain_Value_Definition: a region including the counties of Jackson, Hillsdale, and Lenawee
 - * Enumerated_Domain:

- Enumerated_Domain_Value: 26
- Enumerated_Domain_Value_Definition: a region including the counties of Washtenaw, Wayne, and Monroe
- (5.4.4.5) Attribute_Units_of_Measure: natural / whole interger numbers, positive values.
- (5.4.5) Attribute:
 - (5.4.5.1) Attribute_Label: TABLE#Counties.CountyNumber_byte
 - (5.4.5.2) Attribute_Label_Definition: A unique two or three digit number for each county, assigned by the Kalamazoo Nature Center, during BBA1 and used during BBA2.
 - (5.4.5.3) Attribute_Label_Definition_Source: BBA1 and BBA2
 - (5.4.5.4) Attribute_Domain_Values:
 - (5.4.5.4.1) Enumerated_Domain:
 - (5.4.5.4.1.1) Enumerated_Domain_Value: (specific values are listed below.)
 - (5.4.5.4.1.2) Enumerated_Domain_Value_Definition: the value definition is different for each value as listed below.
 - (as follows:)
 - * Enumerated_Domain:
Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition: Gogebic
 - * Enumerated_Domain:
Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition: Ontonagon
 - * Enumerated_Domain:
Enumerated_Domain_Value: 11
Enumerated_Domain_Value_Definition: Iron
 - * Enumerated_Domain:
Enumerated_Domain_Value: 12
Enumerated_Domain_Value_Definition: Baraga
 - * Enumerated_Domain:
Enumerated_Domain_Value: 13
Enumerated_Domain_Value_Definition: Houghton
 - * Enumerated_Domain:
Enumerated_Domain_Value: 14
Enumerated_Domain_Value_Definition: Keweenaw
 - * Enumerated_Domain:
Enumerated_Domain_Value: 21
Enumerated_Domain_Value_Definition: Menominee
 - * Enumerated_Domain:
Enumerated_Domain_Value: 22
Enumerated_Domain_Value_Definition: Dickinson
 - * Enumerated_Domain:
Enumerated_Domain_Value: 23
Enumerated_Domain_Value_Definition: Marquette
 - * Enumerated_Domain:
Enumerated_Domain_Value: 31
Enumerated_Domain_Value_Definition: Delta
 - * Enumerated_Domain:
Enumerated_Domain_Value: 32
Enumerated_Domain_Value_Definition: Alger
 - * Enumerated_Domain:

Enumerated_Domain_Value: 33
Enumerated_Domain_Value_Definition: Schoolcraft
* Enumerated_Domain:
Enumerated_Domain_Value: 41
Enumerated_Domain_Value_Definition: Mackinac
* Enumerated_Domain:
Enumerated_Domain_Value: 42
Enumerated_Domain_Value_Definition: Luce
* Enumerated_Domain:
Enumerated_Domain_Value: 43
Enumerated_Domain_Value_Definition: Chippewa
* Enumerated_Domain:
Enumerated_Domain_Value: 51
Enumerated_Domain_Value_Definition: Otsego
* Enumerated_Domain:
Enumerated_Domain_Value: 52
Enumerated_Domain_Value_Definition: Charlevoix
* Enumerated_Domain:
Enumerated_Domain_Value: 53
Enumerated_Domain_Value_Definition: Emmet
* Enumerated_Domain:
Enumerated_Domain_Value: 54
Enumerated_Domain_Value_Definition: Cheboygan
* Enumerated_Domain:
Enumerated_Domain_Value: 61
Enumerated_Domain_Value_Definition: Presque Isle
* Enumerated_Domain:
Enumerated_Domain_Value: 62
Enumerated_Domain_Value_Definition: Montmorency
* Enumerated_Domain:
Enumerated_Domain_Value: 63
Enumerated_Domain_Value_Definition: Alpena
* Enumerated_Domain:
Enumerated_Domain_Value: 71
Enumerated_Domain_Value_Definition: Leelanau
* Enumerated_Domain:
Enumerated_Domain_Value: 72
Enumerated_Domain_Value_Definition: Grand Traverse
* Enumerated_Domain:
Enumerated_Domain_Value: 73
Enumerated_Domain_Value_Definition: Antrim
* Enumerated_Domain:
Enumerated_Domain_Value: 81
Enumerated_Domain_Value_Definition: Benzie
* Enumerated_Domain:
Enumerated_Domain_Value: 82
Enumerated_Domain_Value_Definition: Manistee
* Enumerated_Domain:
Enumerated_Domain_Value: 83
Enumerated_Domain_Value_Definition: Wexford
* Enumerated_Domain:

Enumerated_Domain_Value: 91
Enumerated_Domain_Value_Definition: Kalkaska
* Enumerated_Domain:
Enumerated_Domain_Value: 92
Enumerated_Domain_Value_Definition: Crawford
* Enumerated_Domain:
Enumerated_Domain_Value: 93
Enumerated_Domain_Value_Definition: Missaukee
* Enumerated_Domain:
Enumerated_Domain_Value: 94
Enumerated_Domain_Value_Definition: Roscommon
* Enumerated_Domain:
Enumerated_Domain_Value: 101
Enumerated_Domain_Value_Definition: Oscoda
* Enumerated_Domain:
Enumerated_Domain_Value: 102
Enumerated_Domain_Value_Definition: Alcona
* Enumerated_Domain:
Enumerated_Domain_Value: 103
Enumerated_Domain_Value_Definition: Ogemaw
* Enumerated_Domain:
Enumerated_Domain_Value: 104
Enumerated_Domain_Value_Definition: Iosco
* Enumerated_Domain:
Enumerated_Domain_Value: 111
Enumerated_Domain_Value_Definition: Mason
* Enumerated_Domain:
Enumerated_Domain_Value: 112
Enumerated_Domain_Value_Definition: Lake
* Enumerated_Domain:
Enumerated_Domain_Value: 113
Enumerated_Domain_Value_Definition: Oceana
* Enumerated_Domain:
Enumerated_Domain_Value: 114
Enumerated_Domain_Value_Definition: Newaygo
* Enumerated_Domain:
Enumerated_Domain_Value: 121
Enumerated_Domain_Value_Definition: Osceola
* Enumerated_Domain:
Enumerated_Domain_Value: 122
Enumerated_Domain_Value_Definition: Clare
* Enumerated_Domain:
Enumerated_Domain_Value: 123
Enumerated_Domain_Value_Definition: Mecosta
* Enumerated_Domain:
Enumerated_Domain_Value: 124
Enumerated_Domain_Value_Definition: Isabella
* Enumerated_Domain:
Enumerated_Domain_Value: 131
Enumerated_Domain_Value_Definition: Gladwin
* Enumerated_Domain:

Enumerated_Domain_Value: 132
Enumerated_Domain_Value_Definition: Arenac
* Enumerated_Domain:
Enumerated_Domain_Value: 133
Enumerated_Domain_Value_Definition: Midland
* Enumerated_Domain:
Enumerated_Domain_Value: 134
Enumerated_Domain_Value_Definition: Bay
* Enumerated_Domain:
Enumerated_Domain_Value: 141
Enumerated_Domain_Value_Definition: Muskegon
* Enumerated_Domain:
Enumerated_Domain_Value: 142
Enumerated_Domain_Value_Definition: Ottawa
* Enumerated_Domain:
Enumerated_Domain_Value: 143
Enumerated_Domain_Value_Definition: Kent
* Enumerated_Domain:
Enumerated_Domain_Value: 151
Enumerated_Domain_Value_Definition: Montcalm
* Enumerated_Domain:
Enumerated_Domain_Value: 152
Enumerated_Domain_Value_Definition: Gratiot
* Enumerated_Domain:
Enumerated_Domain_Value: 153
Enumerated_Domain_Value_Definition: Ionia
* Enumerated_Domain:
Enumerated_Domain_Value: 161
Enumerated_Domain_Value_Definition: Saginaw
* Enumerated_Domain:
Enumerated_Domain_Value: 162
Enumerated_Domain_Value_Definition: Shiawassee
* Enumerated_Domain:
Enumerated_Domain_Value: 163
Enumerated_Domain_Value_Definition: Genesee
* Enumerated_Domain:
Enumerated_Domain_Value: 171
Enumerated_Domain_Value_Definition: Huron
* Enumerated_Domain:
Enumerated_Domain_Value: 172
Enumerated_Domain_Value_Definition: Tuscola
* Enumerated_Domain:
Enumerated_Domain_Value: 173
Enumerated_Domain_Value_Definition: Sanilac
* Enumerated_Domain:
Enumerated_Domain_Value: 181
Enumerated_Domain_Value_Definition: Allegan
* Enumerated_Domain:
Enumerated_Domain_Value: 182
Enumerated_Domain_Value_Definition: Barry
* Enumerated_Domain:

Enumerated_Domain_Value: 183
Enumerated_Domain_Value_Definition: Kalamazoo
* Enumerated_Domain:
Enumerated_Domain_Value: 191
Enumerated_Domain_Value_Definition: Eaton
* Enumerated_Domain:
Enumerated_Domain_Value: 192
Enumerated_Domain_Value_Definition: Ingham
* Enumerated_Domain:
Enumerated_Domain_Value: 193
Enumerated_Domain_Value_Definition: Clinton
* Enumerated_Domain:
Enumerated_Domain_Value: 201
Enumerated_Domain_Value_Definition: Livingston
* Enumerated_Domain:
Enumerated_Domain_Value: 202
Enumerated_Domain_Value_Definition: Oakland
* Enumerated_Domain:
Enumerated_Domain_Value: 211
Enumerated_Domain_Value_Definition: Lapeer
* Enumerated_Domain:
Enumerated_Domain_Value: 212
Enumerated_Domain_Value_Definition: St. Clair
* Enumerated_Domain:
Enumerated_Domain_Value: 213
Enumerated_Domain_Value_Definition: Macomb
* Enumerated_Domain:
Enumerated_Domain_Value: 221
Enumerated_Domain_Value_Definition: Berrien
* Enumerated_Domain:
Enumerated_Domain_Value: 222
Enumerated_Domain_Value_Definition: Van Buren
* Enumerated_Domain:
Enumerated_Domain_Value: 223
Enumerated_Domain_Value_Definition: Cass
* Enumerated_Domain:
Enumerated_Domain_Value: 231
Enumerated_Domain_Value_Definition: Calhoun
* Enumerated_Domain:
Enumerated_Domain_Value: 232
Enumerated_Domain_Value_Definition: St. Joseph
* Enumerated_Domain:
Enumerated_Domain_Value: 233
Enumerated_Domain_Value_Definition: Branch
* Enumerated_Domain:
Enumerated_Domain_Value: 241
Enumerated_Domain_Value_Definition: Jackson
* Enumerated_Domain:
Enumerated_Domain_Value: 242
Enumerated_Domain_Value_Definition: Hillsdale
* Enumerated_Domain:

- Enumerated_Domain_Value: 243
- Enumerated_Domain_Value_Definition: Lenawee
- * Enumerated_Domain:
 - Enumerated_Domain_Value: 251
 - Enumerated_Domain_Value_Definition: Washtenaw
- * Enumerated_Domain:
 - Enumerated_Domain_Value: 252
 - Enumerated_Domain_Value_Definition: Wayne
- * Enumerated_Domain:
 - Enumerated_Domain_Value: 253
 - Enumerated_Domain_Value_Definition: Monroe
- (5.4.5.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.4.6) Attribute:
 - (5.4.6.1) Attribute_Label: TABLE#Counties.StateRegion_text3
 - (5.4.6.2) Attribute_Label_Definition: The coarse ecoregion in which the county resides, within the State of Michigan; roughly divides the State into three equivalent regional areas; and is used by MDNR and others for regional information needs.
 - (5.4.6.3) Attribute_Label_Definition_Source: BBA1 and BBA2
 - (5.4.6.4) Attribute_Domain_Values:
 - (5.4.6.4.1) Enumerated_Domain:
 - (5.4.5.4.1.1) Enumerated_Domain_Value: (specific values are listed below.)
 - (5.4.5.4.1.2) Enumerated_Domain_Value_Definition: The value definition is different for each value as listed below.
 - (as follows:)
 - * Enumerated_Domain:
 - Enumerated_Domain_Value: UP
 - Enumerated_Domain_Value_Definition: Upper Peninsula
 - * Enumerated_Domain:
 - Enumerated_Domain_Value: NLP
 - Enumerated_Domain_Value_Definition: Northern Lower Peninsula
 - * Enumerated_Domain:
 - Enumerated_Domain_Value: SLP
 - Enumerated_Domain_Value_Definition: Southern Lower Peninsula
 - (5.4.6.4.1.3) Enumerated_Domain_Value_Definition_Source: BBA1or BBA2 or both, using regional label names based on peninsula names (as per source USGS, USPS, and Michigan law).
- (5.5) Overview_Description: **COLLECTED FIELD OBSERVATION INFORMATION FOR BREEDING CODES** (see Entity_Type_Definition in Section 5.5.1.2)
 - (5.5.1) Entity_Type: table
 - (5.5.1.1) Entity_Type_Label: TABLE#BreedingCodes
 - (5.5.1.2) Entity_Type_Definition: Access table that contains the defined breeding codes used to record breeding status for Atlas use, along with fields that rank the codes by probability of successful breeding. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set.
 - (5.5.1.3) Entity_Type_Definition_Source: Table attributes and values are similar but modified by KNC for BBA1 and BBA2, from the source: NORAC. 2012. "Standardized Breeding Criteria Codes: Recommendations for North American

Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe.

(5.5.2) Attribute:

(5.5.2.1) Attribute_Label: TABLE#BreedingCodes.BreedingCodeID_longint

(5.5.2.2) Attribute_Label_Definition: primary key of the TABLE#BreedingCodes table. This value is a sequentially assigned long integer value.

(5.5.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (note: This key field is new and was not in the BBA1, BBA2 or KNC database products).

(5.5.2.4) Attribute_Domain_Values:

(5.5.2.4.1) Enumerated_Domain: (not applicable).

(5.5.2.4.2) Range_Domain:

(5.5.2.4.2.1) Range_Domain_Minimum: 1

(5.5.2.4.2.2) Range_Domain_Maximum: 39

(5.5.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.

(5.5.3) Attribute:

(5.5.3.1) Attribute_Label: TABLE#BreedingCodes.BreedingCode_text2

(5.5.3.2) Attribute_Label_Definition: One or two character alphabetic code that describes breeding behaviors or physical evidence of breeding.

(5.5.3.3) Attribute_Label_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm>.

(5.5.3.4) Attribute_Domain_Values:

(5.5.3.4.1) Enumerated_Domain:

(5.5.5.4.1.1) Enumerated_Domain_Value: (Specific values are listed below. Caution: These field values must to be used along with a field that identifies if it was from the BBA1 or BBA2 project. The value definition for a single value can be altered depending if it was from the BBA1 project or the BBA2 project. Note these are paired with the corresponding Enumerated_Domain_Value_Definition but as they all have the same source, described in 5.9.5.4.1.3, these blocks are not repeated per each value.)

(5.5.5.4.1.2) Enumerated_Domain_Value_Definition: (The value definition is different for each Enumerated_Domain_Value value as listed below.)

(5.5.5.4.1.3) Enumerated_Domain_Value_Definition_Source: Modified for BBA1, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .

(as follows:)

* Enumerated_Domain:

Enumerated_Domain_Value: O

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is O and 1, the definition means “Species (male or female) observed during the breeding season, but believed not to be breeding in the block.”

* Enumerated_Domain:

Enumerated_Domain_Value: /

- Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is / and 1, the definition means “Species (male or female) observed in suitable nesting habitat during its breeding season.”
- * Enumerated_Domain:
Enumerated_Domain_Value: X
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is X and 1, the definition means “Singing male present in suitable nesting habitat during its breeding season”
 - * Enumerated_Domain:
Enumerated_Domain_Value: M
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is M and 1, the definition means “Seven or more singing males present in suitable nesting habitat during their breeding season.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: P
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is P and 1, the definition means “Pair observed in suitable nesting habitat during its breeding season.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: T
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is T and 1, the definition means “Permanent territory presumed through defense (e.g. chasing other birds, or song at the same location on at least two occasions a week or more apart).”
 - * Enumerated_Domain:
Enumerated_Domain_Value: C
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is C and 1, the definition means “Courtship behavior or copulation.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: N
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is N and 1, the definition means “Visiting probable nest-site.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: A
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint

- Enumerated_Domain_Value; when the combination is A and 1, the definition means “Agitated behavior or anxiety calls from adult(s).”
- * Enumerated_Domain:
Enumerated_Domain_Value: B
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is B and 1, the definition means “Nest building by wrens or excavation of holes by woodpeckers.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: NB
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is NB and 1, the definition means “Nest building by all except woodpeckers and wrens.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: PE
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is PE and 1, the definition means “Physiological evidence of breeding (e.g., highly vascularized, edematous incubation [brood] patch or egg in oviduct) based on bird in hand.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: DD
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is DD and 1, the definition means “Distraction display or injury feigning.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: UN
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is UN and 1, the definition means “Used nests or eggshells found. (These must be carefully identified if they are to be accepted.)”
 - * Enumerated_Domain:
Enumerated_Domain_Value: FL
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is FL and 1, the definition means “Recently fledged young (of altricial species) incapable of sustained flight or downy young (of precocial species) restricted to the natal area by dependence on adults or limited mobility.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: ON
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is ON and 1, the

definition means “Occupied nest: adults entering or leaving nest site in circumstances indicating occupied nest (includes high nests or nest holes, the contents of which cannot be seen) or adult incubating or brooding.”

- * Enumerated_Domain:
Enumerated_Domain_Value: AY
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is FY and 1, the definition means “Attending young: adult carrying fecal sac or food for young, or feeding recently fledged young.”
- * Enumerated_Domain:
Enumerated_Domain_Value: NE
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is NE and 1, the definition means “Nest with egg(s).”
- * Enumerated_Domain:
Enumerated_Domain_Value: NY
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is NY and 1, the definition means “Nest with young seen or heard.”
- * Enumerated_Domain:
Enumerated_Domain_Value: O
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is O and 2, the definition means “Species observed during its breeding season, but no evidence of breeding in block.”
- * Enumerated_Domain:
Enumerated_Domain_Value: V
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is V and 2, the definition means “Species Observed in suitable nesting habitat during its breeding season.” (This is the same as the “#” used on many of the written forms and was changed to an Alphabetical value to match our system.)
- * Enumerated_Domain:
Enumerated_Domain_Value: X
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is X and 2, the definition means “Singing male present in suitable nesting habitat during its breeding season”
- * Enumerated_Domain:
Enumerated_Domain_Value: S
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is S and 2, the

definition means “Singing male present at same location on at least two dates at least seven days apart or multiple (5 or more) singing males on same date during the breeding season.”

- * Enumerated_Domain:
Enumerated_Domain_Value: P
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is P and 2, the definition means “Pair observed in suitable nesting habitat during its breeding season.”
- * Enumerated_Domain:
Enumerated_Domain_Value: T
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is T and 2, the definition means “Territorial Behavior (chasing individuals of the same species).”
- * Enumerated_Domain:
Enumerated_Domain_Value: C
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is C and 2, the definition means “Courtship behavior or copulation.”
- * Enumerated_Domain:
Enumerated_Domain_Value: N
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is N and 2, the definition means “Visiting probable nest-site.”
- * Enumerated_Domain:
Enumerated_Domain_Value: A
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is A and 2, the definition means “Agitated behavior or anxiety calls from adult.”
- * Enumerated_Domain:
Enumerated_Domain_Value: B
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is B and 2, the definition means “Nest building by wrens or excavation of holes by woodpeckers.”
- * Enumerated_Domain:
Enumerated_Domain_Value: NB
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is NB and 2, the definition means “Nest building by all except woodpeckers and wrens.”
- * Enumerated_Domain:
Enumerated_Domain_Value: PE

- Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is PE and 2, the definition means “Physiological evidence of breeding or brooding based on bird in hand”
- * Enumerated_Domain:
Enumerated_Domain_Value: DD
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is DD and 2, the definition means “Distraction display or injury feigning.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: UN
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is UN and 2, the definition means “Used nests or eggshells found. Caution: These must be carefully identified.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: FL
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is FL and 2, the definition means “Recently fledged young (of altricial species) incapable of sustained flight, or downy young (of precocial species).”
 - * Enumerated_Domain:
Enumerated_Domain_Value: ON
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is ON and 2, the definition means “Occupied nest – adults entering or leaving nest site in circumstances indicating occupied nest (includes high nest or nest-holes, the contents of which cannot be seen) or adult incubating or brooding.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: FY
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is FY and 2, the definition means “Adult(s) with food for young (carrying food) or feeding young.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: FS
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is FS and 2, the definition means “Adult carrying fecal sac.”
 - * Enumerated_Domain:
Enumerated_Domain_Value: NE
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint

Enumerated_Domain_Value; when the combination is NE and 2, the definition means “Nest with eggs.”

* Enumerated_Domain:

Enumerated_Domain_Value: NY

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint

Enumerated_Domain_Value; when the combination is NY and 2, the definition means “Nest with young seen or heard.”

(5.5.4) Attribute:

(5.5.4.1) Attribute_Label: TABLE#BreedingCodes.CodeDescription_memo

(5.5.4.2) Attribute_Label_Definition: A brief text description of the breeding status code in each record.

(5.5.4.3) Attribute_Label_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm>.

(5.5.4.4) Attribute_Domain_Values:

(5.5.4.4.1) Enumerated_Domain: (not applicable).

(5.5.4.4.2) Range_Domain: (not applicable).

(5.5.4.4.3) Codeset_Domain: (not applicable).

(5.5.4.4.3) Unrepresentable_Domain: free text information.

(5.5.5) Attribute:

(5.5.5.1) Attribute_Label: TABLE#BreedingCodes.BreedingCodeNumber_byte

(5.5.5.2) Attribute_Label_Definition: Numeric ranking system of the values in TABLE#BreedingCodes.BreedingCode_text2. Used to assign relative certainty of breeding based on observed breeding evidence when multiple observations exist for the same block.

(5.5.5.3) Attribute_Label_Definition_Source: BBA1 and BBA2.

(5.5.5.4) Attribute_Domain_Values:

(5.5.5.4.1) Enumerated_Domain:

(5.5.5.4.1.1) Enumerated_Domain_Value: (several values as labels composed of numbers, listed below.)

(5.5.5.4.1.2) Enumerated_Domain_Value_Definition: (definitions vary with value, listed below.)

(5.5.5.4.1.3) Enumerated_Domain_Value_Definition_Source: (BBA1 or BBA2 for all listed below; as can vary, the source is provided per value. Note: using this attribute field requires using the project identifier for BBA1 or BBA2 for source of observation).

(as follows:)

* Enumerated_Domain:

Enumerated_Domain_Value: 5

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint

Enumerated_Domain_Value; when the combination is 5 and 1, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: O “Species (male or female) observed during the breeding season, but believed not to be breeding in the block.”

Enumerated_Domain_Value_Definition_Source: BBA1.

* Enumerated_Domain:

- Enumerated_Domain_Value: 55
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 55 and 1, the definition means Represents TABLE#BreedingCodes.BreedingCode_text2: / “Species (male or female) observed in suitable nesting habitat during its breeding season.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 60
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 60 and 1, the definition means Represents TABLE#BreedingCodes.BreedingCode_text2: X “Singing male present in suitable nesting habitat during its breeding season.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 103
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 103 and 1, the definition means Represents TABLE#BreedingCodes.BreedingCode_text2: M “Seven or more singing males present in suitable nesting habitat during their breeding season.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 105
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 105 and 1, the definition means Represents TABLE#BreedingCodes.BreedingCode_text2: P “Pair observed in suitable nesting habitat during its breeding season.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 110
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 110 and 1, the definition means Represents TABLE#BreedingCodes.BreedingCode_text2: T “Permanent territory presumed through defense (e.g., chasing other birds, or song at the same location on at least two occasions a week or more apart).”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 115
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint

- Enumerated_Domain_Value; when the combination is 115 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: C “Courtship behavior or copulation.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 120
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 120 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: N “Visiting probable nest-site.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 125
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 125 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: A “Agitated behavior or anxiety calls from adult(s).”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 130
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 130 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: B “Nest building by wrens or excavation of holes by woodpeckers.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 155
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 155 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: NB “Nest building by all except woodpeckers and wrens.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 160
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 160 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: PE “Physiological evidence of breeding (e.g., highly vascularized, edematous incubation [brood] patch or egg in oviduct) based on bird in hand.”
Enumerated_Domain_Value_Definition_Source: BBA1.

- * Enumerated_Domain:
Enumerated_Domain_Value: 165
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 165 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: DD “Distraction display or injury feigning.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 170
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 170 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: UN “Used nests or eggshells found. (These must be carefully identified if they are to be accepted.)”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 175
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 196 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: FL “Recently fledged young (of altricial species) incapable of sustained flight, or downy young (of precocial species) restricted to the natal area by dependence on adults or limited mobility.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 180
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 180 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: ON “Occupied nest: adults entering or leaving nest site in circumstances indicating occupied nest (includes high nests or nest-holes, the contents of which cannot be seen) or adult incubating or brooding.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 185
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 185 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: AY “Attending young: adult carrying fecal sac or food for young, or feeding recently fledged young.”
Enumerated_Domain_Value_Definition_Source: BBA1.

- * Enumerated_Domain:
Enumerated_Domain_Value: 190
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 190 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: NE “Nest with egg(s).”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 195
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 195 and 1, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: NY “Nest with young seen or heard.”
Enumerated_Domain_Value_Definition_Source: BBA1.
- * Enumerated_Domain:
Enumerated_Domain_Value: 5
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 5 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: O “Species observed during its breeding season, but no evidence of breeding in block.”
Enumerated_Domain_Value_Definition_Source: BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 55
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 55 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: V “Species Observed in suitable nesting habitat during its breeding season.”
Enumerated_Domain_Value_Definition_Source: BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 60
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 60 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: X “Singing male present in suitable nesting habitat during its breeding season.”
Enumerated_Domain_Value_Definition_Source: BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 103
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 103 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: S “Singing male

present at same location on at least two dates at least seven days apart or multiple (5 or more) singing males on same date during the breeding season.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 105

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 105 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: P “Pair observed in suitable nesting habitat during breeding season.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 110

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 110 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: T “Territorial behavior (chasing individuals of the same species).”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 115

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 115 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: C “Courtship behavior or copulation.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 120

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 120 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: N “Visiting probable nest-site.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 125

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 125 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: A “Agitated behavior or anxiety calls from adult.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 130

- Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 130 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: B “Nest building by wrens or excavation of holes by woodpeckers.”
Enumerated_Domain_Value_Definition_Source: BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 155
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 155 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: NB “Nest building by all except woodpeckers and wrens.”
Enumerated_Domain_Value_Definition_Source: BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 160
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 160 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: PE “Physiological evidence of breeding or brooding based on bird in hand.”
Enumerated_Domain_Value_Definition_Source: BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 165
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 165 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: DD “Distraction display or injury feigning.”
Enumerated_Domain_Value_Definition_Source: BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 170
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 170 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: UN “Used nests or eggshells found. Caution: These must be carefully identified.”
Enumerated_Domain_Value_Definition_Source: BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 175
Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 196 and 2, the definition means Represents
TABLE#BreedingCodes.BreedingCode_text2: FL “Recently fledged young (of altricial species) incapable of sustained flight, or downy

young (of precocial species) restricted to the natal area by dependence.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 180

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 180 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: ON “Occupied nest – adults entering or leaving nest site in circumstances indicating occupied nest (includes high nests or nest-holes, the contents of which cannot be seen) or adult incubating or brooding.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 187

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 187 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: FY “Adult(s) with food for young (carrying food) or feeding young.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 188

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 188 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: FS “Adult carrying fecal sac.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 190

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 190 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: NE “Nest with eggs.”

Enumerated_Domain_Value_Definition_Source: BBA2.

* Enumerated_Domain:

Enumerated_Domain_Value: 195

Enumerated_Domain_Value_Definition: This value definition is a combination dependent upon TABLE#Projects.ProjectID_longint Enumerated_Domain_Value; when the combination is 195 and 2, the definition means Represents

TABLE#BreedingCodes.BreedingCode_text2: NY “Nest with young seen or heard.”

Enumerated_Domain_Value_Definition_Source: BBA2.

(5.5.5.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.

(5.5.6) Attribute:

(5.5.6.1) Attribute_Label_Name:

TABLE#BreedingCodes.BreedingLevelCategoryCode_byte

(5.5.6.2) Attribute_Label_Definition: An alphabetic abbreviation for the breeding confirmation level of specific breeding activities.

(5.5.6.3) Attribute_Label_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online < <http://www.bsc-eoc.org/norac/atlascodes.htm> >.

(5.5.6.4) Attribute_Domain_Values:

(5.5.6.4.1) Enumerated_Domain:

(5.5.5.4.1.1) Enumerated_Domain_Value: (several values as labels composed combinations of letters, listed below.)

(5.5.5.4.1.2) Enumerated_Domain_Value_Definition: (definitions vary with value, listed below.)

(5.5.5.4.1.3) Enumerated_Domain_Value_Definition_Source: (BBA1 or BBA2 for all listed below; as can vary, the source is provided per value. Note: using this attribute field requires using the project identifier for BBA1 or BBA2 for source of observation).

(as follows:)

* Enumerated_Domain:

Enumerated_Domain_Value: OB

Enumerated_Domain_Value_Definition: Represents NORAC category code Observed. Includes

TABLE#BreedingCodes.BreedingCodeNumber_byte value 5.

Enumerated_Domain_Value_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .

* Enumerated_Domain:

Enumerated_Domain_Value: PO

Enumerated_Domain_Value_Definition: Represents NORAC category code Possible. Includes

TABLE#BreedingCodes.BreedingCodeNumber_byte values >5 and <100.

Enumerated_Domain_Value_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .

* Enumerated_Domain:

Enumerated_Domain_Value: PR

Enumerated_Domain_Value_Definition: Represents NORAC category code Probable. Includes

TABLE#BreedingCodes.BreedingCodeNumber_byte values >99 and <150.

Enumerated_Domain_Value_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .

* Enumerated_Domain:

Enumerated_Domain_Value: CO

Enumerated_Domain_Value_Definition: Represents NORAC category code Confirmed. Includes
TABLE#BreedingCodes.BreedingCodeNumber_byte values >149.

Enumerated_Domain_Value_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .

(5.5.7) Attribute:

(5.5.7.1) Attribute_Label_Name:

TABLE#BreedingCodes.BreedingLevelCategoryNumber_text2

(5.5.7.2) Attribute_Label_Definition: Numeric ranking system of the values in TABLE#BreedingCodes.BreedingLevelCategoryCode_text2. Used to assign relative certainty of breeding based on observed breeding evidence when multiple observations exist for the same block.

(5.5.7.3) Attribute_Label_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .

(5.5.7.4) Attribute_Domain_Values:

(5.5.7.4.1) Enumerated_Domain:

(5.5.7.4.1.1) Enumerated_Domain_Value: (several values as labels composed of single interger numbers, 0,1,2,and 3, as listed below.)

(5.5.7.4.1.2) Enumerated_Domain_Value_Deinifition: (definitions vary with value, listed below.)

(5.5.7.4.1.3) Enumerated_Domain_Value_Definition_Source: (BBA1 or BBA2 for all listed below; as can vary, the source is provided per value. Note: using this attribute field requires using the project identifier for BBA1 or BBA2 for source of observation.... Is

Enumerated_Domain_Value_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .)

(as follows:)

* Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Represents NORAC category code Observed. Indicates

TABLE#BreedingCodes.BreedingLevelCategoryCode_text2 value O.

- Enumerated_Domain_Value_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. "Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects", NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .
- * Enumerated_Domain:
Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition: Represents NORAC category code Possible. Indicates
TABLE#BreedingCodes.BreedingLevelCategoryCode_text2 value PO.
- Enumerated_Domain_Value_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. "Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects", NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .
- * Enumerated_Domain:
Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition: Represents NORAC category code Probable. Indicates
TABLE#BreedingCodes.BreedingLevelCategoryCode_text2 value PR.
- Enumerated_Domain_Value_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. "Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects", NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .
- * Enumerated_Domain:
Enumerated_Domain_Value: 3
Enumerated_Domain_Value_Definition: Represents NORAC category code Confirmed. Indicates
TABLE#BreedingCodes.BreedingLevelCategoryCode_text2 value CO.
- (5.5.7.4.1.3) Enumerated_Domain_Value_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. "Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects", NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online at <http://www.bsc-eoc.org/norac/atlascodes.htm> .
- (5.5.7.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.5.8) Attribute:
- (5.5.8.1) Attribute_Label_Name:
TABLE#BreedingCodes.BreedingCodeSortOrder_byte
- (5.5.8.2) Attribute_Label_Definition: Relative ordering of individual values of TABLE#BreedingCodes.BreedingCode_text2 within a single project based on code ordering defined by "Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects", NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online < <http://www.bsc-eoc.org/norac/atlascodes.htm> >.

- (5.5.8.3) Attribute_Label_Definition_Source: Modified for BBA1 and BBA2, from the source: NORAC. 2012. “Standardized Breeding Criteria Codes: Recommendations for North American Breeding Bird Atlas Projects”, NORAC, Sarah B. Laughlin, Janet R. Carroll, and Sally M. Sutcliffe. Available online < <http://www.bsc-eoc.org/norac/atlascodes.htm> >.
- (5.5.8.4) Attribute_Domain_Values:
 - (5.5.8.4.1) Enumerated_Domain: (not applicable).
 - (5.5.8.4.2) Range_Domain:
 - (5.5.8.4.1.1) Range_Domain_Minimum: 0
 - (5.5.8.4.1.2) Range_Domain_Maximum: 255
- (5.5.8.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.5.9) Attribute:
 - (5.5.9.1) Attribute_Label: TABLE#Projects.ProjectID_longint
 - (5.5.9.2) Attribute_Label_Definition: Foreign key from TABLE#Projects table, references the atlas project being described.
 - (5.5.9.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.5.9.4) Attribute_Domain_Values:
 - (5.5.9.4.1) Enumerated_Domain: (not applicable).
 - (5.5.9.4.2) Range_Domain:
 - (5.5.9.4.2.1) Range_Domain_Minimum: 1
 - (5.5.9.4.2.2) Range_Domain_Maximum: 2
 - (5.5.9.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.6) Overview_Description: **COLLECTED FIELD OBSERVATION INFORMATION FOR PROJECT BLOCKS** (see Entity_Type_Definition in Section 5.6.1.2)
 - (5.6.1) Entity_Type: Table
 - (5.6.1.1) Entity_Type_Label: TABLE#ProjectBlocks
 - (5.6.1.2) Entity_Type_Definition: Access table that identifies the valid survey blocks by project for BBA1 and BBA2 and their relative survey priority levels. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set.
 - (5.6.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.
 - (5.6.2) Attribute
 - (5.6.2.1) Attribute_Label: TABLE#ProjectBlocks.ProjectBlockID_longint
 - (5.6.2.2) Attribute_Label_Definition: Primary key of the TABLE#ProjectBlocks table. This value is a sequentially assigned long integer value.
 - (5.6.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project. (Note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.6.2.4) Attribute_Domain_Values:
 - (5.6.2.4.1) Enumerated_Domain: (not applicable).
 - (5.6.2.4.2) Range_Domain:
 - (5.6.2.4.2.1) Range_Domain_Minimum: 1
 - (5.6.2.4.2.2) Range_Domain_Maximum: 14270
 - (5.6.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.

- (5.6.3) Attribute:
 - (5.6.3.1) Attribute_Label: TABLE#ProjectBlocks.SurveyBlockID_longint
 - (5.6.3.2) Attribute_Label_Definition: Foreign key from table TABLE#SurveyBlocks; references the breeding bird atlas survey block being described.
 - (5.6.3.3) Attribute_Label_Definition_Source: TABLE#SurveyBlocks
 - (5.6.3.4) Attribute_Domain_Values:
 - (5.6.3.4.1) Enumerated_Domain: (not applicable).
 - (5.6.3.4.2) Range_Domain:
 - (5.6.3.4.2.1) Range_Domain_Minimum: 1
 - (5.6.3.4.2.2) Range_Domain_Maximum: 7202
 - (5.6.3.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.6.4) Attribute:
 - (5.6.4.1) Attribute_Label: TABLE#Projects.ProjectID_longint
 - (5.6.4.2) Attribute_Label_Definition: Foreign key from TABLE#Projects table, references the atlas project being described.
 - (5.6.4.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project. (Note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.6.4.4) Attribute_Domain_Values:
 - (5.6.4.4.1) Enumerated_Domain: (not applicable).
 - (5.6.4.4.2) Range_Domain:
 - (5.6.4.4.2.1) Range_Domain_Minimum: 1
 - (5.6.4.4.2.2) Range_Domain_Maximum: 2
 - (5.6.4.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.6.5) Attribute:
 - (5.6.5.1) Attribute_Label: TABLE#ProjectBlocks.PriorityLevel_byte
 - (5.6.5.2) Attribute_Label_Definition: The priority level assigned to a block by the Kalamazoo Nature Center. Selection of priority blocks was random for BBA1 at a rate of one block per township in the UP, two blocks per township in the NLP, and four blocks per township in the SLP. Priority blocks for BBA2 were randomly selected from the BBA1 priority blocks at a rate of one block per township statewide. For BBA2, one secondary block was also selected for each township. In the NLP, the secondary block in each township consisted of the priority block from BBA1 which was not selected as the priority block for BBA2. Secondary blocks were randomly selected in the SLP and UP.
 - (5.6.5.3) Attribute_Label_Definition_Source: Kalamazoo Nature Center
 - (5.6.5.4) Attribute_Domain_Values:
 - (5.6.5.4.1) Enumerated_Domain:
 - (5.6.5.4.1.1) Enumerated_Domain_Value: 1, 2, or 0
 - (5.6.5.4.1.2) Enumerated_Domain_Value_Definition: Priority block information within each township, where 1 means the priority block and 2 means the secondary block, leaving at most 2 other blocks coded as 0 (as blocks are quarter of a township block).
 - (5.6.5.4.1.3) Enumerated_Domain_Value_Source: Kalamazoo Nature Center (as follows:)
 - * Enumerated_Domain:
Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition: Priority block in each township.
 - * Enumerated_Domain:

Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition: Secondary block in each township.

* Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Blocks that have no priority value assigned.

(5.6.5.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.

(5.7) Overview_Description: **COLLECTED FIELD OBSERVATION INFORMATION FOR SURVEY BLOCKS** (see Entity_Type_Definition in Section 5.7.1.2)

(5.7.1) Entity_type: table.

(5.7.1.1) Entity_Type_Label: TABLE#SurveyBlocks

(5.7.1.2) Entity_Type_Definition: Table describing Michigan Breeding Bird Atlas survey blocks under the U.S. Public Land Survey System as defined by the BLM and Michigan DNR. All blocks identified as valid survey units for BBA1 and BBA2 are included. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set. The Michigan PLSS is a specific set of information about the PLSS irregular grid system for the State of Michigan. The Michigan geospatial data comes from the source: MGD. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online at <http://www.mcgi.state.mi.us/mgdl>. Accessed 11 October 2012. The PLSS is structured according to the standards and practices from the citation: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov ; online at <http://www.blmsurveymanual.org/index.html> . Accessed 20 November 2012

(5.7.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

(5.7.2) Attribute:

(5.7.2.1) Attribute_Label: TABLE#SurveyBlocks.SurveyBlockID_longint

(5.7.2.2) Attribute_Label_Definition: primary key of the TABLE#SurveyBlocks table. This value is a sequentially assigned long integer value.

(5.7.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

Note: This key field is new and was not in the BBA1, BBA2 or KNC database products.

(5.7.2.4) Attribute_Domain_Values:

(5.7.2.4.1) Enumerated_Domain: (not applicable).

(5.7.2.4.2) Range_Domain:

(5.7.2.4.2.1) Range_Domain_Minimum: 1

(5.7.2.4.2.2) Range_Domain_Maximum: 11197

(5.7.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.

(5.7.3) Attribute:

- (5.7.3.1) Attribute_Label: TABLE#SurveyBlocks.Town_text2
 - (5.7.3.2) Attribute_Label_Definition: The numeric portion of the township number of a parcel of land based upon the U.S. Public Land Survey System. Single digit numbers are preceded by a leading “0” to create values that are uniformly two digits.
 - (5.7.3.3) Attribute_Label_Definition_Source: Michigan PLSS.
 - (5.7.3.4) Attribute_Domain_Values:
 - (5.7.3.4.1) Enumerated_Domain: (not applicable).
 - (5.7.3.4.2) Range_Domain:
 - (5.7.3.4.2.1) Range_Domain_Minimum: 01
 - (5.7.3.4.2.2) Range_Domain_Maximum: 68
 - (5.7.3.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.7.4) Attribute:
- (5.7.4.1) Attribute_Label: TABLE#SurveyBlocks.TownDirection_text1
 - (5.7.4.2) Attribute_Label_Definition: The directional portion of the township number of a parcel of land based on the PLSS, indicating whether it is to the North or to the South of the designated base line.
 - (5.7.4.3) Attribute_Label_Definition_Source: Michigan PLSS.
 - (5.7.4.4) Attribute_Domain_Values:
 - (5.7.4.4.1) Enumerated_Domain:
 - (5.7.4.4.1.1) Enumerated_Domain_Value: N or S
 - (5.7.4.4.1.2) Enumerated_Domain_Value_Definition: N meaning north of the Michigan baseline, or S meaning south of the Michigan baseline
 - (5.7.4.4.1.3) Enumerated_Domain_Value_Definition_Source: Michigan PLSS.
(as follows:)
 - * Enumerated_Domain:
Enumerated_Domain_Value: N
 - * Enumerated_Domain:
Enumerated_Domain_Value: S
- (5.7.5) Attribute:
- (5.7.5.1) Attribute_Label: TABLE#SurveyBlocks.Range_text2
 - (5.7.5.2) Attribute_Label_Definition: The numeric portion of the range number of a parcel of land based upon the PLSS. Single digit numbers are preceded by a leading “0” to create values that are uniformly two digits.
 - (5.7.5.3) Attribute_Label_Definition_Source: Michigan PLSS.
 - (5.7.5.4) Attribute_Domain_Values:
 - (5.7.5.4.1) Enumerated_Domain: (not applicable).
 - (5.7.5.4.2) Range_Domain:
 - (5.7.5.4.2.1) Range_Domain_Minimum: 01
 - (5.7.5.4.2.2) Range_Domain_Maximum: 49
 - (5.7.5.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.7.6) Attribute:
- (5.7.6.1) Attribute_Label: TABLE#SurveyBlocks.RangeDirection_text1
 - (5.7.6.2) Attribute_Label_Definition: The directional portion of the range number of a parcel of land based on the PLSS, indicating whether it is to the East or to the West of the designated principal meridian.
 - (5.7.6.3) Attribute_Definition_Source: Michigan PLSS.
 - (5.7.6.4) Attribute_Domain_Values:
 - (5.7.6.4.1) Enumerated_Domain:

(5.7.6.4.1.1) Enumerated_Domain_Value: E or W

(5.7.6.4.1.2) Enumerated_Domain_Value_Definition: E meaning east of the Michigan meridian (84° 22' 24" W Longitude), or W meaning west of the Michigan meridian (84° 22' 24" W Longitude).

(5.7.6.4.1.3) Enumerated_Domain_Value_Definition_Source: Michigan PLSS.
(as follows:)

- * Enumerated_Domain:
Enumerated_Domain_Value: E
- * Enumerated_Domain:
Enumerated_Domain_Value: W

(5.7.7) Attribute:

(5.7.7.1) Attribute_Label: TABLE#SurveyBlocks.BlockNumber_text1

(5.7.7.2) Attribute_Label_Definition: One quarter of a township, approximately 9 square miles, referred to as a "Breeding Bird Atlas Block"; baseline geographic survey unit statewide.

(5.7.7.3) Attribute_Label_Definition_Source: BBA1 and BBA2.

(5.7.7.4) Attribute_Domain_Values:

(5.7.7.4.1) Enumerated_Domain:

(5.7.7.4.1.1) Enumerated_Domain_Value: 1, 2, 3, or 4

(5.7.7.4.1.2) Enumerated_Domain_Value_Definition: each value represents a survey block or atlas block, and actually is the outline around a set of sections corresponding to a quarter of the original township/tier-range block which contains those sections - meaning divide it in half north-south and also east-west, which results in a northeast, northwest, southeast and southwest quarter township/tier-range block areas.

(5.7.7.4.1.3) Enumerated_Domain_Value_Definition_Source: BBA1 and BBA2
(as follows:)

- * Enumerated_Domain:
Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition: The northeast quarter of a township, consisting of the sections 1, 2, 3, 10, 11, 12, 13, 14, and 15 if they exist.
Enumerated_Domain_Value_Definition_Source: BBA1 and BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition: The northwest quarter of a township, consisting of the sections 4, 5, 6, 7, 8, 9, 16, 17, and 18 if they exist.
Enumerated_Domain_Value_Definition_Source: BBA1 and BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 3
Enumerated_Domain_Value_Definition: The southwest quarter of a township, consisting of the sections 19, 20, 21, 28, 29, 30, 31, 32, and 33 if they exist.
Enumerated_Domain_Value_Definition_Source: BBA1 and BBA2.
- * Enumerated_Domain:
Enumerated_Domain_Value: 4
Enumerated_Domain_Value_Definition: The southeast quarter of a township, consisting of the sections 22, 23, 24, 25, 26, 27, 34, 35, and 36 if they exist.
Enumerated_Domain_Value_Definition_Source: BBA1 and BBA2.

- (5.7.7.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.7.8) Attribute:
 - (5.7.8.1) Attribute_Label: TABLE#SurveyBlocks.CountyID_longint
 - (5.7.8.2) Attribute_Label_Definition: Foreign key from table TABLE#Counties; references the county in which the BBA survey block resides. For the most part, all four blocks within a township, and all parts within a single block, are contained in the same county. When a block straddles a county line, it is assigned to the county that contains the majority of the block's area.
NOTE: Seventeen townships within the BBA framework straddle a county line (or include more than one county): 05S10E (Wayne/Monroe), 05S11E (Wayne/Monroe), 10N12E (Sanilac/Lapeer), 13N04E (Bay/Saginaw), 13N05E (Bay/Saginaw), 28N09W (Antrim/Grand Traverse), 28N11W (Leelanau/Grand Traverse), 29N11W (Leelanau/Grand Traverse), 30N10E (Alpena/Alcona), 34N06W (Emmet/Charlevoix), 36N24W (Delta/Menominee), 38N01W (Mackinac/Cheboygan), 39N02W (Mackinac/Cheboygan), 47N35W (Baraga/Houghton), 48N35W (Baraga/Houghton), 49N35W (Baraga/Houghton), and 50N35W (Baraga/Houghton). Queries that group results by county and township will yield inconsistent results unless corrections are made for this duplication of township values in multiple counties.
 - (5.7.8.3) Attribute_Label_Definition_Source: TABLE#Counties
 - (5.7.8.4) Attribute_Domain_Values:
 - (5.7.8.4.1) Enumerated_Domain: (not applicable).
 - (5.7.8.4.2) Range_Domain:
 - (5.7.8.4.2.1) Range_Domain_Minimum: 1
 - (5.7.8.4.2.2) Range_Domain_Maximum: 83
 - (5.7.8.4.2.3) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
 - (5.7.8.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.8) Overview_Description: **COLLECTED FIELD OBSERVATION INFORMATION FROM SURVEY FORMS** (see Entity_Type_Definition in Section 5.8.1.2)
 - (5.8.1) Entity_Type: Table
 - (5.8.1.1) Entity_Type_Label: TABLE#SurveyForms
 - (5.8.1.2) Entity_Type_Definition: Access table that contains survey form data common to all observations on that survey form. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set.
 - (5.8.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.
 - (5.8.2) Attribute:
 - (5.8.2.1) Attribute_Label: TABLE#SurveyForms.SurveyFormID_longint
 - (5.8.2.2) Attribute_Label_Definition: primary key of the TABLE#SurveyForms table. This value is a sequentially assigned long integer value.
 - (5.8.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.8.2.4) Attribute_Domain_Values:
 - (5.8.2.4.1) Enumerated_Domain: (not applicable).
 - (5.8.2.4.2) Range_Domain:

- (5.8.2.4.2.1) Range_Domain_Minimum: 1
- (5.8.2.4.2.2) Range_Domain_Maximum: 58017
- (5.8.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.8.3) Attribute:
 - (5.8.3.1) Attribute_Label: TABLE#SurveyForms.CardNumber_text10
 - (5.8.3.2) Attribute_Label_Definition: Unique identifier of each survey form submitted within a BBA project; cards were numbered sequentially upon submission, and sequence numbers may be duplicated across projects. BBA1 card numbers are generally prepended with a letter code indicating whether the survey form were a casual observation card (C) or a species checklist (S).
 - (5.8.3.3) Attribute_Label_Definition_Source: BBA1 and BBA2.
 - (5.8.3.4) Attribute_Domain_Values:
 - (5.8.3.4.1) Enumerated_Domain: (not applicable)
 - (5.8.3.4.2) Range_Domain: (not applicable)
 - (5.8.3.4.3) Codeset_Domain: (not applicable)
 - (5.8.3.4.4) Unrepresentable_Domain: free text information.
- (5.8.4) Attribute:
 - (5.8.4.1) Attribute_Label: TABLE#SurveyForms.SectionNumber_byte
 - (5.8.4.2) Attribute_Label_Definition: The PLSS section number in which the observation was made. Observers were not required to provide section numbers for all observations.
 - (5.8.4.3) Attribute_Label_Definition_Source: Michigan PLSS
 - (5.8.4.4) Attribute_Domain_Range:
 - (5.8.3.4.1) Enumerated_Domain: (not applicable)
 - (5.8.3.4.2) Range_Domain: (not applicable)
 - (5.8.3.4.2.1) Domain_Range_Minimum: 1
 - (5.8.3.4.2.2) Domain_Range_Maximum: 36
 - (5.8.4.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.8.5) Attribute:
 - (5.8.5.1) Attribute_Label: TABLE#SurveyForms.HoursSurveyed_single
 - (5.8.5.2) Attribute_Label_Definition: The time dedicated to the collection of the information associated with a single survey form. Hours were recorded on species checklist forms by observers while conducting surveys. Hour values were assigned to point counts based on the point count protocol in use when the data was collected. No data was collected on hours spent surveying on casual observation cards. Multiple errors were found in this field during data verification (e.g., no value entered in database vs. value written on survey form; value entered in database vs. no value written on survey form; survey form recorded incomplete survey effort [i.e., observations made on multiple dates while effort was recorded on a single date]; both database and survey form had effort values recorded, but these values were not the same). All data in this field should be treated as suspect.
 - (5.8.5.3) Attribute_Label_Definition_Source: Kalamazoo Nature Center, during BBA1 and BBA2.
 - (5.8.5.4) Attribute_Domain_Values:
 - (5.8.5.4.1) Enumerated_Domain: (not applicable)
 - (5.8.5.4.2) Range_Domain: (not applicable)
 - (5.8.5.4.3) Codeset_Domain: (not applicable)

- (5.8.5.4.4) Unrepresentable_Domain: time as decimal hours (not completely a normal decimal number as time is base 60 sec in 60 min in 1 hour, converted).
- (5.8.5.5) Attribute_Units_of_Measurement: Decimal Hours
- (5.8.5.6) Attribute_Value_Accuracy_Information: For species checklists where the observer failed to provide an accounting of their time spent surveying, a value was assigned based on an observation rate of .033 hours of surveying per species observed. Casual observations were not assigned survey time values.
- (5.8.6) Attribute:
 - (5.8.6.1) Attribute_Label: TABLE#SurveyForms.ObservationYear_int
 - (5.8.6.2) Attribute_Label_Definition: The year in which the survey was conducted.
 - (5.8.6.3) Attribute_Label_Definition_Source: BBA1 and BBA2.
 - (5.8.6.4) Attribute_Domain_Values:
 - (5.8.6.4.1) Enumerated_Domain: (not applicable)
 - (5.8.6.4.2) Range_Domain: (not applicable)
 - (5.8.6.4.2) Range_Domain_Minimum: 1983
 - (5.8.6.4.2) Range_Domain_Maximum: 2008
 - (5.8.6.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.8.7) Attribute:
 - (5.8.7.1) Attribute_Label: TABLE#SurveyForms.FormType_text4
 - (5.8.7.2) Attribute_Label_Definition: The survey method used by the observer to record the data.
 - (5.8.7.3) Attribute_Label_Definition_Source: Kalamazoo Nature Center
 - (5.8.7.4) Attribute_Domain_Values:
 - (5.8.6.4.1) Enumerated_Domain:
 - (5.8.6.4.1.1) Enumerated_Domain_Value: C, S or P
 - (5.8.6.4.1.2) Enumerated_Domain_Value_Definition: a single character letter where represents: “C” means Observer recorded data on a casual observation card, generally used for less than 10 species which are observed in passing; a “S” means Observer submitted data on a species checklist form; or a “P” means Observer recorded data on a point count data collection sheet, following either the 5 minute or 10 minute protocol as described in the Atlas Handbook.
 - (5.8.6.4.1.3) Enumerated_Domain_Value_Source: Kalamazoo Nature Center, during BBA1 and BBA2.
 - * Enumerated_Domain:
Enumerated_Domain_Value: C
Enumerated_Domain_Value_Definition: Observer recorded data on a casual observation card, generally used for less than 10 species which are observed in passing.
Enumerated_Domain_Value_Definition_Source: Kalamazoo Nature Center, during BBA1 and BBA2.
 - * Enumerated_Domain:
Enumerated_Domain_Value: S
Enumerated_Domain_Value_Definition: Observer submitted data on a species checklist form.
 - * Enumerated_Domain:
Enumerated_Domain_Value: P
Enumerated_Domain_Value_Definition: Observer recorded data on a point count data collection sheet, following either the 5 minute or 10 minute protocol as described in the Atlas Handbook.

Enumerated_Domain_Value_Definition_Source: Kalamazoo Nature Center, during BBA1 and BBA2.

- (5.8.8) Attribute:
- (5.8.8.1) Attribute_Label: TABLE#Projects.ProjectID_longint
 - (5.8.8.3) Attribute_Label_Definition: Foreign key from TABLE#Projects table, references the atlas project being described.
 - (5.8.8.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.8.8.4) Attribute_Domain_Values:
 - (5.8.8.4.1) Enumerated_Domain: (not applicable)
 - (5.8.8.4.2) Range_Domain:
 - (5.8.8.4.2.1) Range_Domain_Minimum: 1
 - (5.8.8.4.2.2) Range_Domain_Maximum: 2
 - (5.8.8.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.8.9) Attribute:
- (5.8.9.1) Attribute_Label: TABLE#SurveyForms.SurveyBlockID_longint
 - (5.8.9.1) Attribute_Label_Definition: Foreign key from table TABLE#SurveyBlocks;
 - (5.8.9.2) references the breeding bird atlas survey block being described.
 - (5.8.9.3) Attribute_Label_Definition_Source: TABLE#SurveyBlocks
 - (5.8.9.4) Attribute_Domain_Values:
 - (5.8.9.4.1) Enumerated_Domain: (not applicable)
 - (5.8.9.4.2) Range_Domain:
 - (5.8.9.4.2.1) Range_Domain_Minimum: 1
 - (5.8.9.4.2.2) Range_Domain_Maximum: 7202
 - (5.8.8.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.8.10) Attribute:
- (5.8.10.1) Attribute_Label: TABLE#SurveyForms.ObserverID_longint
 - (5.8.10.2) Attribute_Label_Definition: Foreign key from table TABLE#Participants; references the observer who collected the observations. Note: This field is not included in the publicly available version of the MDNR Wildlife Division Combo-BBA1-2 Project data set.
 - (5.8.10.3) Attribute_Label_Definition_Source: TABLE#Participants
 - (5.8.10.4) Attribute_Domain_Values:
 - (5.8.10.4.1) Enumerated_Domain: (not applicable)
 - (5.8.10.4.2) Range_Domain:
 - (5.8.10.4.2.1) Range_Domain_Minimum: 1
 - (5.8.10.4.2.2) Range_Domain_Maximum: 607
 - (5.8.10.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.8.11) Attribute:
- (5.8.11.1) Attribute_Label: TABLE#SurveyForms.FoiaID_longint
 - (5.8.11.2) Attribute_Label_Definition: a unique identifier for each participant in the Breeding Bird Atlas projects that can act as a surrogate foreign key for TABLE#Participants. This field is distinct from the primary key value in TABLE#Participants.ParticipantID_longint, contains a quasirandom value, and can be used to distinguish between individual participants in publicly released data sets while remaining compliant with Michigan Freedom of Information Act privacy protections. This value is a sequentially assigned long integer value.

- (5.8.11.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.8.11.4) Attribute_Domain_Values:
 - (5.8.11.4.1) Enumerated_Domain: (not applicable)
 - (5.8.11.4.2) Range_Domain:
 - (5.8.11.4.2.1) Range_Domain_Minimum: 1
 - (5.8.11.4.2.2) Range_Domain_Maximum: 610
 - (5.8.11.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.9) Overview_Description: **COLLECTED FIELD OBSERVATION INFORMATION – record per observation** (see Entity_Type_Definition in Section 5.9.1.2)
- (5.9.1) Entity_Type: Table
 - (5.9.1.1) Entity_Type_Label: TABLE#BirdObservations
 - (5.9.1.2) Entity_Type_Definition: Access Table containing a record for each field observation. For the BBA1 project, only a single record per block or section for each species was entered in the database; this record contained the observation with the breeding code with the highest probability to document breeding.
 - (5.9.1.3) Entity_Type_Definition_Source: Kalamazoo Nature Center, during BBA1 and BBA2.
 - (5.9.2) Attribute:
 - (5.9.2.1) Attribute_Label: TABLE#BirdObservations.ObservationID_longint
 - (5.9.2.1) Attribute_Label_Definition: primary key of the TABLE#BirdObservations table. This value is a sequentially assigned long integer value.
 - (5.9.2.1) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.9.2.1) Attribute_Domain_Values:
 - (5.9.2.4.1) Enumerated_Domain: (not applicable)
 - (5.9.2.4.2) Range_Domain:
 - (5.9.2.4.2.1) Range_Domain_Minimum: 1
 - (5.9.2.4.2.1) Range_Domain_Maximum: 773851
 - (5.9.2.1) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
 - (5.9.3) Attribute:
 - (5.9.3.1) Attribute_Label: TABLE#BirdObservations.SpeciesID_longint
 - (5.9.3.2) Attribute_Label_Definition: Foreign key from table TABLE#Taxonomy; references the species being described.
 - (5.9.3.3) Attribute_Label_Definition_Source: TABLE#Taxonomy
 - (5.9.3.4) Attribute_Domain_Values:
 - (5.9.3.4.1) Enumerated_Domain: (not applicable)
 - (5.9.3.4.2) Range_Domain:
 - (5.9.3.4.2.1) Range_Domain_Minimum: 1
 - (5.9.3.4.2.2) Range_Domain_Maximum: 336
 - (5.9.3.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
 - (5.9.4) Attribute:
 - (5.9.4.1) Attribute_Label: TABLE#BirdObservations.NumberObserved_int

- (5.9.4.2) Attribute_Label_Definition: Number of family group equivalents observed; a family group equivalent is defined as the number of birds necessary for or indicative of breeding by a single pair of birds (e.g., one singing male, one pair of birds, an adult with a brood of young or on a nest). This data is not available for BBA1. From examination of the submitted survey forms, it is apparent that there was confusion among observers as to the appropriate value to record for this field (e.g. total number of birds, total number of pairs, etc). All data in this field should be treated as suspect.
- (5.9.4.3) Attribute_Label_Definition_Source: Kalamazoo Nature Center, during BBA1 and BBA2.
- (5.9.4.4) Attribute_Domain_Values:
 - (5.9.5.4.1) Enumerated_Domain: (not applicable)
 - (5.9.5.4.2) Range_Domain:
 - (5.9.4.4.2.1) Range_Domain_Minimum: 1
 - (5.9.4.4.2.2) Range_Domain_Maximum: 32,767
- (5.9.4.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.9.5) Attribute:
 - (5.9.5.1) Attribute_Label: TABLE#BirdObservations.BreedingCodeID_longint
 - (5.9.5.2) Attribute_Label_Definition: Foreign key from table TABLE#BreedingCodes; references the breeding behavior being described.
 - (5.9.5.3) Attribute_Label_Definition_Source: TABLE#BreedingCodes
 - (5.9.5.4) Attribute_Domain_Values:
 - (5.9.5.4.1) Enumerated_Domain: (not applicable)
 - (5.9.5.4.2) Range_Domain:
 - (5.9.5.4.2.1) Range_Domain_Minimum: 1
 - (5.9.5.4.2.2) Range_Domain_Maximum: 39
 - (5.9.5.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.9.6) Attribute:
 - (5.9.6.1) Attribute_Label: TABLE#BirdObservations.ObservationDate_meddate
 - (5.9.6.2) Attribute_Label_Definition: The date the observation was made
 - (5.9.6.3) Attribute_Label_Definition_Source: Kalamazoo Nature Center, during BBA1 and BBA2.
 - (5.9.6.4) Attribute_Domain_Values:
 - (5.9.6.4.1) Enumerated_Domain: (not applicable)
 - (5.9.6.4.2) Range_Domain: (not applicable)
 - (5.9.6.4.3) Codeset_Domain: (not applicable)
 - (5.9.6.4.4) Unrepresentable_Domain: medium Date Format
- (5.9.7) Attribute:
 - (5.9.7.1) Attribute_Label: TABLE#BirdObservations.SurveyFormID_longint
 - (5.9.7.2) Attribute_Label_Definition: Foreign key from table TABLE#SurveyForms; references the survey form on which the observation was recorded..
 - (5.9.7.3) Attribute_Label_Definition_Source: TABLE#SurveyForms
 - (5.9.7.4) Attribute_Domain_Values:
 - (5.9.7.4.1) Enumerated_Domain: (not applicable)
 - (5.9.7.4.2) Range_Domain:
 - (5.9.7.4.2.1) Range_Domain_Minimum: 1
 - (5.9.7.4.2.2) Range_Domain_Maximum: 58017
- (5.9.8) Attribute:
 - (5.9.8.1) Attribute_Label: TABLE#BirdObservations.RecordVerified_yesno

- (5.9.8.2) Attribute_Label_Definition: An indication of whether or not the record in the table TABLE#BirdObservations was found on a hard copy survey form. Individual survey forms were verified in their entirety, i.e. all observations on the reviewed forms were either matched to existing records or added to the database as new records. If a survey form in the database contains both verified and unverified observations, those unverified observations were missing from the source data form. Verification was performed on a subset of BBA2 data.
- (5.9.8.3) Attribute_Label_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.
- (5.9.8.4) Attribute_Domain_Values:
- (5.9.8.4.1) Enumerated_Domain:
- (5.9.8.4.1.1) Enumerated_Domain_Value: True
- (5.9.8.4.1.2) Enumerated_Domain_Value_Definition: Record was located on hard copy survey form.
- (5.9.8.4.3) Enumerated_Domain_Value_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project .
- (as follows:)
- * Enumerated_Domain:
Enumerated_Domain_Value: True
Enumerated_Domain_Value_Definition: Record was located on hard copy survey form.
Enumerated_Domain_Value_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project .
 - * Enumerated_Domain:
Enumerated_Domain_Value: False
Enumerated_Domain_Value_Definition: Record was not located on hard copy survey form.
Enumerated_Domain_Value_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project
- (5.9.9) Attribute:
- (5.9.9.1) Attribute_Label: TABLE#BirdObservations.CorrectionMade_yesno
- (5.9.9.2) Attribute_Label_Definition: An indication of whether or not the record in the table TABLE#BirdObservations was changed based on data recorded on a hard copy survey form. When missing data on the survey form was extrapolated by KNC to populate the database (e.g. observation date was missing from the survey form, but an observation date was entered in the database), no correction was made to the database.
- (5.9.9.3) Attribute_Label_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.
- (5.9.9.4) Attribute_Domain_Values:
- (5.9.9.4.1) Enumerated_Domain:
- (5.9.9.4.1.1) Enumerated_Domain_Value: True
- (5.9.9.4.1.2) Enumerated_Domain_Value_Definition: Record was changed based on data from hard copy survey form or new record added based on data from hard copy survey form.
- (5.9.9.4.1.3) Enumerated_Domain_Value_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.
- (as follows:)
- * Enumerated_Domain:
Enumerated_Domain_Value: True

Enumerated_Domain_Value_Definition: Record was changed based on data from hard copy survey form or new record added based on data from hard copy survey form.

Enumerated_Domain_Value_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

* Enumerated_Domain:

Enumerated_Domain_Value: False

Enumerated_Domain_Value_Definition: Record was not changed.

Enumerated_Domain_Value_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

(5.9.10) Attribute:

(5.9.10.1) Attribute_Label: TABLE#BirdObservations.CorrectionComments_text150

(5.9.10.2) Attribute_Label_Definition: An indication of what corrections were made to the record or data issues with the record which could not be corrected. When a single field value was changed, this is noted by indicating the original value and the corrected value; when a record was added, this is indicated with a comment of "added"; when errors were found which could not be corrected (i.e. RecordVerified_yesno = True, CorrectionMade_yesno = False, CorrectionComments_text150 is not Null), the nature of the data issue is described..

(5.9.10.3) Attribute_Label_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

(5.9.10.4) Attribute_Domain_Values:

(5.9.10.4.1) Enumerated_Domain: (not applicable)

(5.9.10.4.2) Range_Domain: (not applicable)

(5.9.10.4.3) Codeset_Domain: (not applicable)

(5.9.10.4.4) Unrepresentable_Domain: free text information.

(5.10) Overview_Description: **COLLECTED FIELD OBSERVATION INFORMATION – species taxonomy of observations** (see Entity_Type_Definition in Section 5.10.1.2)

(5.10.1) Entity Type: Table

(5.10.1.1) Entity_Type_Label: TABLE#Taxonomy

(5.10.1.2) Entity_Type_Definition: table;

a Microsoft Access database table which contains taxonomic details for those species of birds recorded during the BBA1 and BBA2 projects. The table consists of the species common and scientific names, 4 letter alphabetical code, taxonomy from order to subfamily, and state and federal Endangered Species Act status. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set.

(5.10.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

(5.10.2) Attribute:

(5.10.2.1) Attribute_Label: TABLE#Taxonomy.SpeciesID_longint

(5.10.2.2) Attribute_Label_Definition: primary key of the TABLE#Taxonomy table. This value is a sequentially assigned long integer value.

(5.10.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (note: This key field is new and was not in the BBA1, BBA2 or KNC database products).

(5.10.2.4) Attribute_Domain_Values:

(5.10.2.4.1) Enumerated_Domain: (not applicable)

(5.10.2.4.2) Range_Domain:

- (5.10.2.4.2.1) Range_Domain_Minimum: 2
- (5.10.2.4.2.2) Range_Domain_Maximum: 336
- (5.10.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.10.3) Attribute:
 - (5.10.3.1) Attribute_Label: TABLE#Taxonomy.SpeciesAlphaCode_text4
 - (5.10.3.2) Attribute_Definition: Text field of four letter codes for avian species developed by the Bird Banding Laboratory
 - (5.10.3.3) Attribute_Definition_Source: USGS. 1997. The North American Bird Banding Manual (Electronic Version). Version 1.0., Edited by Gustafson, M. E., J. Hildenbrand and L. Metras; 1997. Patuxent Wildlife Research Center; Online at <http://www.pwrc.usgs.gov/BBL/manual/bandsize.cfm> , United States Geological Survey (USGS), US Department of the Interior; USGS National Center, 12201 Sunrise Valley Drive, Reston, VA 20192, USA, phone: 703-648-5953 or 1-888-ASK-USGS (1-888-275-8747); online at <http://www.usgs.gov>. Accessed 11 October 2014.
 - (5.10.3.4) Attribute Domain Values:
 - (5.2.19.4.1) Enumerated_Domain: (not applicable)
 - (5.2.19.4.2) Range_Domain: (not applicable)
 - (5.2.19.4.3) Codeset_Domain:
 - (5.2.19.4.3.1)Codeset_Name: “Species Numbers, Alpha Codes and Recommended Band Sizes”
 - (5.2.19.4.3.2)Codeset_Source: USGS. 1997. The North American Bird Banding Manual (Electronic Version). Version 1.0., Edited by Gustafson, M. E., J. Hildenbrand and L. Metras; 1997. Patuxent Wildlife Research Center; Online at <http://www.pwrc.usgs.gov/BBL/manual/bandsize.cfm>, United States Geological Survey, US Department of the Interior; USGS National Center, 12201 Sunrise Valley Drive, Reston, VA 20192, USA, phone: 703-648-5953 or 1-888-ASK-USGS (1-888-275-8747); online at <http://www.usgs.gov>. Accessed 11 October 2014.
- (5.10.4) Attribute:
 - (5.10.4.1) Attribute_Label: TABLE#Taxonomy.CommonName_text50
 - (5.10.4.2) Attribute_Definition: Species common name
 - (5.10.4.3) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists’ Union (AOU) Bird Species Check-list. The American Ornithologists’ Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012. Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.
 - (5.10.4.4) Attribute_Domain_Values:
 - (5.10.4.4.1) Enumerated_Domain:
 - (5.10.4.4.1) Enumerated_Domain: (not applicable)
 - (5.10.4.4.2) Range_Domain: (not applicable)
 - (5.10.4.4.3) Codeset_Domain: (not applicable)
 - (5.10.4.4.4) Unrepresentable_Domain: free text string 50 characters wide.
- (5.10.5) Attribute:
 - (5.10.5.1) Attribute_Label: TABLE#Taxonomy.ScientificName_text50
 - (5.10.5.2) Attribute_Definition: Species scientific name following standard binomial nomenclature

- (5.10.5.3) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012. Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.
- (5.10.5.4) Attribute_Domain_Values:
 - (5.10.5.4.1) Enumerated_Domain:
 - (5.10.5.4.1) Enumerated_Domain: (not applicable)
 - (5.10.5.4.2) Range_Domain: (not applicable)
 - (5.10.5.4.3) Codeset_Domain: (not applicable)
 - (5.10.5.4.4) Unrepresentable_Domain: free text string 50 characters wide.
- (5.10.6) Attribute:
 - (5.10.6.1) Attribute_Label: TABLE#Taxonomy.TaxaOrder_text50
 - (5.10.6.2) Attribute_Definition: Taxonomic level below class into which the species is categorized. All birds are members of class Aves.
 - (5.10.6.3) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012. Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.
 - (5.10.6.4) Attribute_Domain_Values:
 - (5.10.6.4.1) Enumerated_Domain:
 - (5.10.6.4.1) Enumerated_Domain: (not applicable)
 - (5.10.6.4.2) Range_Domain: (not applicable)
 - (5.10.6.4.3) Codeset_Domain: (not applicable)
 - (5.10.6.4.4) Unrepresentable_Domain: free text string 50 characters wide.
- (5.10.7) Attribute:
 - (5.10.7.1) Attribute_Label: TABLE#Taxonomy.TaxaFamily_text50
 - (5.10.7.1) Attribute_Definition: Taxonomic level below order into which the species is categorized. All orders are partitioned into families.
 - (5.10.7.1) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012. Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.
 - (5.10.7.4) Attribute_Domain_Values:
 - (5.10.5.4.1) Enumerated_Domain:
 - (5.10.5.4.1) Enumerated_Domain: (not applicable)
 - (5.10.5.4.2) Range_Domain: (not applicable)
 - (5.10.5.4.3) Codeset_Domain: (not applicable)
 - (5.10.5.4.4) Unrepresentable_Domain: free text string 50 characters wide.
- (5.10.8) Attribute:
 - (5.10.8.1) Attribute_Label: TABLE#Taxonomy.TaxaSubfamily_text50
 - (5.10.8.1) Attribute_Definition: Taxonomic level below family into which the species is categorized. Not all families are partitioned into subfamilies.

- (5.10.8.1) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012. Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.
- (5.10.8.4) Attribute_Domain_Values:
 - (5.10.8.4.1) Enumerated_Domain:
 - (5.10.8.4.1) Enumerated_Domain: (not applicable)
 - (5.10.8.4.2) Range_Domain: (not applicable)
 - (5.10.8.4.3) Codeset_Domain: (not applicable)
 - (5.10.8.4.4) Unrepresentable_Domain: free text string 50 characters wide.
- (5.10.9) Attribute:
 - (5.10.9.1) Attribute_Label: TABLE#Taxonomy.SortOrder_double
 - (5.10.9.2) Attribute_Definition: Numeric value indicating the relative order of species in the standard recognized taxonomic order listing maintained by the AOU.
 - (5.10.9.3) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012. Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011. Relative taxonomic order of species is provided by the AOU checklist. Sort order values are of the format oo.ffspp* where <oo> is a sequential number assigned to all available order values, <ff> is a two digit sequential number assigned to each family within an individual order, <ss> is a two digit sequential number assigned to each subfamily within an individual family, and <pp*> is a sequential number of at least two digits assigned to each species within a subfamily. When a family is not subdivided into subfamilies, all species within that family are assigned a value of 01 for <ss>. There is no limit on the number of digits in the <pp*> section of the sort value to allow for a robust and stable numbering system which provides flexibility in reordering individual entries as taxonomic changes occur (e.g., a new species can be inserted between 16.030122 and 16.030123 at position 16.0301225 without a need to modify any other records). e.g., 16.030123: 16.03/01/23: 16th order in AOU taxonomic list (Charadriiformes); 3rd family in Charadriiformes in the list of Michigan's breeding birds (Scolopacidae); 1st subfamily in Scolopacidae in the list of Michigan's breeding birds (Scolopacinae); 23rd species in Scolopacinae in the list of Michigan's breeding birds (Scolopax minor).
- (5.10.8.4) Attribute_Domain_Values:
 - (5.10.8.4.1) Enumerated_Domain:
 - (5.10.8.4.1) Enumerated_Domain: (not applicable)
 - (5.10.8.4.2) Range_Domain: (not applicable)
 - (5.10.8.4.3) Codeset_Domain: (not applicable)
 - (5.10.8.4.4) Unrepresentable_Domain: natural or whole interger numbers, positive values.
- (5.10.10) Attribute:
 - (5.10.10.1) Attribute_Label: TABLE#Taxonomy.FederalESAStatus_text6
 - (5.10.10.2) Attribute_Definition: May be a null value, assigned a code based on species status in the United States of America. Endangered species are

protected by the authority of Federal statute/laws, as per citation: USHR. 2012. US House of Representatives (USHR), Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884). Revised and effective 1995. US Legislature, United States of America, contact c/o US House of Representatives, Washington, DC 20515 ; telephone 1-202-224-3121 ; online at < <http://www.house.gov> >. Publication is available online at [http://uscode.house.gov/uscode-cgi/fastweb.exe?getdoc+uscview+t13t16+7354+0++\(\)%20%20AND%20](http://uscode.house.gov/uscode-cgi/fastweb.exe?getdoc+uscview+t13t16+7354+0++()%20%20AND%20). Accessed 20 November 2012. Note: a USFWS summary of the US Endangered Species Act of 1973 is online at <http://www.fws.gov/laws/lawsdigest/esact.html> . Accessed 20 November 2012.

(5.10.10.3) Attribute_Definition_Source:

The United States Threatened / Endangered Species List is from the citation: USFWS. 2012. Threatened / Endangered Wildlife in the US and Foreign Species. United State Fish and Wildlife Service (USFWS), Endangered Species Program, 4401 N. Fairfax Drive, Room 420 Arlington, VA 22203 ; telephone 1-703-358-2171 ; online at < <http://www.fws.gov/endangered> >. Michigan is in Region 3 - Great Lakes, Big Rivers; Region 3 USFWS Office, United States Fish and Wildlife Service, 5600 American Boulevard West, Suite 990, Bloomington, Minnesota 55437-1458 USA; telephone 1-612-713-5334 ; online at < <http://www.fws.gov/midwest/endangered> >. Publication is available online at < http://ecos.fws.gov/tess_public/pub/listedAnimals.jsp >. Accessed 20 November 2012.

(5.10.10.4) Attribute_Domain_Values:

(5.10.10.4.1) Enumerated_Domain:

* Enumerated_Domain:

Enumerated_Domain_Value: LE

Enumerated_Domain_Value_Definition: Listed Endangered

Enumerated_Domain_Value_Definition_Source: United States Threatened / Endangered Species List.

(5.10.11) Attribute:

(5.10.11.1) Attribute_Label: TABLE#Taxonomy.StateRarityStatus_text4

(5.10.11.2) Attribute_Definition: May be a null value; assigned a code based on species status in the State of Michigan. Species on this list are the Endangered (E), Threatened (T), and Extirpated (X) animal species of Michigan as per citation: SOM. 1994. State of Michigan (SOM), Act 451 of 1994, Part 365, Natural Resources and Environmental Protection Act. State of Michigan, Lansing, Michigan, USA. Online at <http://legislature.mi.gov/doc.aspx?mcl-451-1994-III-1-ENDANGERED-SPECIES-365>. Accessed 20 November 2012. Also included in this field are animal species designated as Special Concern (SC) by the Michigan State University Extension Office's Michigan Natural Features Inventory, using international standards set by NatureServe. Citation: NatureServe. 2010. Natural Heritage Methodology. NatureServe Home Office, 4600 North Fairfax Drive, 7th Floor, Arlington, Virginia 22203 USA ; telephone 1-703-908-1800 ; facsimile 1-703-229-1670 ; online at <http://www.natureserve.org/prodServices/heritagemethodology.jsp>. Accessed 20 November 2012.

(5.10.11.3) Attribute_Definition_Source: Michigan Endangered and Threatened Species List is from the citation: DNR. 2009. Michigan Administrative Code, Michigan Department of Natural Resources Wildlife Division, Endangered and

Threatened Species Rule 299.1026 Birds; Revised and effective 2009. The Michigan Department of Natural Resources Wildlife Division, State of Michigan, Post Office Box 30444, Lansing, Michigan 48909 USA; telephone 517-284-9453; facsimile 517-373-9566; online at http://www7.dleg.state.mi.us/orr/Files/AdminCode/102_46_AdminCode.pdf . Accessed 20 November 2012. Michigan Species of Special Concern are from the citation: MNFI. 2009. Michigan's Special Animals: Species of Concern, Revised 2009. The Michigan Natural Features Inventory, Michigan State University Extension Office, Post Office Box 30444, Lansing, MI 48909-7944 USA ; telephone 1-517-373-1552 ; facsimile 1-517-373-9566 ; online at <http://web4.msue.msu.edu/mnfi/data/specialanimals.cfm#grp2>. Accessed 20 November 2012.

(5.10.11.4) Attribute_Domain_Values:

(5.10.11.4.1) Enumerated_Domain:

(5.10.11.4.1.1) Enumerated_Domain_Value: E, T, SC or X (4 values or null).

(5.10.11.4.1.2) Enumerated_Domain_Value_Definition: E means that species is Endangered; T means species is Threatened; SC means it's a species of Concern; X means species presumed Extirpated or extinct in state; and a null (no) value means none of listed apply.

(5.10.11.4.1.3) Enumerated_Domain_Value_Definition_Source: Michigan Endangered and Threatened Species List, in Michigan Statue Public Laws.

(as follows:)

* Enumerated_Domain:

Enumerated_Domain_Value: E

Enumerated_Domain_Value_Definition: Endangered

Enumerated_Domain_Value_Definition_Source: Michigan Endangered and Threatened Species List.

* Enumerated_Domain:

Enumerated_Domain_Value: T

Enumerated_Domain_Value_Definition: Threatened

Enumerated_Domain_Value_Definition_Source: Michigan Endangered and Threatened Species List.

* Enumerated_Domain:

Enumerated_Domain_Value: SC

Enumerated_Domain_Value_Definition: Special Concern

Enumerated_Domain_Value_Definition_Source: Michigan Species of Special Concern.

* Enumerated_Domain:

Enumerated_Domain_Value: X

Enumerated_Domain_Value_Definition: Presumed extirpated
(automatically listed as threatened if rediscovered)

Enumerated_Domain_Value_Definition_Source: Michigan Endangered and Threatened Species List.

(5.11) Overview_Description: COLLECTED FIELD OBSERVATION INFORMATION – species taxonomy of observations – Obsolete Taxonomy (see Entity_Type_Definition in Section 5.11.1.2).

(5.11.1) Entity_Type: Table

(5.11.1.1) Entity_Type_Label: TABLE#ObsoleteTaxonomy

(5.11.1.2) Entity_Type_Definition: Table; a Microsoft Access database table which contains old taxonomic details for those species of birds recorded during the

BBA1 and BBA2 projects whose scientific or common name has changed since the beginning of the BBA1 project period. The table consists of the species common and scientific names, taxonomy from order to family, and record of date/explanation for changes. MDNR Wildlife Division staff created this table during preparation of the MDNR Wildlife Division Combo-BBA1-2 Project data set.

- (5.11.1.2) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.
- (5.11.2) Attribute:
 - (5.11.2.1) Attribute_Label: TABLE#ObsoleteTaxonomy.TaxonomyHistoryID_longint
 - (5.11.2.2) Attribute_Label_Definition: primary key of the TABLE#ObsoleteTaxonomy table. This value is a sequentially assigned long integer value.
 - (5.11.2.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project (note: This key field is new and was not in the BBA1, BBA2 or KNC database products).
 - (5.11.2.4) Attribute_Domain_Values:
 - (5.11.2.4.1) Enumerated_Domain: (not applicable)
 - (5.11.2.4.2) Range_Domain:
 - (5.11.2.4.2.1) Range_Domain_Minimum: 1
 - (5.11.2.4.2.1) Range_Domain_Maximum: 56
 - (5.11.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.11.3) Attribute:
 - (5.11.3.1) Attribute_Label: TABLE#ObsoleteTaxonomy.SpeciesID_longint
 - (5.11.3.2) Attribute_Label_Definition: Foreign key from table TABLE#Taxonomy; references the species whose taxonomy has changed.
 - (5.11.3.3) Attribute_Label_Definition_Source: TABLE#Taxonomy
 - (5.11.3.4) Attribute_Domain_Values:
 - (5.11.3.4.1) Enumerated_Domain: (not applicable)
 - (5.11.3.4.2) Range_Domain:
 - (5.11.3.4.2.1) Range_Domain_Minimum: 1
 - (5.11.3.4.2.2) Range_Domain_Maximum: 336
 - (5.11.3.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
- (5.11.4) Attribute:
 - (5.11.4.1) Attribute_Label: TABLE#ObsoleteTaxonomy.ObsoleteSpeciesAlphaCode_text4
 - (5.11.4.2) Attribute_Definition: Text field of four letter codes for avian species developed by the Bird Banding Laboratory; not the currently accepted code
 - (5.11.4.3) Attribute_Definition_Source: Gustafson, M. E., J. Hildenbrand and L. Metras. 1997. The North American Bird Banding Manual (Electronic Version). Version 1.0, Available online: <http://www.pwrc.usgs.gov/BBL/manual/manual.cfm> . Limited to species of Michigan.
 - (5.11.4.4) Attribute Domain Values:
 - (5.11.4.4.1) Enumerated_Domain: (not applicable)
 - (5.11.4.4.2) Range_Domain: (not applicable)
 - (5.11.4.4.3) Codeset_Domain:
 - (5.11.4.4.3.1) Codeset_Name: "Species Numbers, Alpha Codes and Recommended Band Sizes"

(5.11.4.4.3.1) Codeset_Source: USGS, Patuxent Wildlife Research Center. Gustafson, M. E., J. Hildenbrand and L. Metras. 1997. The North American Bird Banding Manual (Electronic Version). Version 1.0 Available online: <http://www.pwrc.usgs.gov/BBL/manual/bandsize.cfm>

(5.11.5) Attribute:

(5.11.5.1) Attribute_Label: TABLE#ObsoleteTaxonomy.
ObsoleteCommonName_text50

(5.11.5.2) Attribute_Definition: Species common name; not the currently accepted common name

(5.11.5.3) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012. Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.

(5.11.5.4) Attribute_Domain_Values:

(5.11.5.4.1) Enumerated_Domain:

(5.11.5.4.1) Enumerated_Domain: (not applicable)

(5.11.5.4.2) Range_Domain: (not applicable)

(5.11.5.4.3) Codeset_Domain: (not applicable)

(5.11.5.4.4) Unrepresentable_Domain: free text string 50 characters wide.

(5.11.6) Attribute:

(5.11.6.1) Attribute_Label: TABLE#ObsoleteTaxonomy.
ObsoleteScientificName_text50

(5.11.6.1) Attribute_Definition: Species scientific name following standard binomial nomenclature; not the currently accepted scientific name

(5.11.6.1) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012. Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.

(5.11.6.4) Attribute_Domain_Values:

(5.11.6.4.1) Enumerated_Domain:

(5.11.6.4.1) Enumerated_Domain: (not applicable)

(5.11.6.4.2) Range_Domain: (not applicable)

(5.11.6.4.3) Codeset_Domain: (not applicable)

(5.11.6.4.4) Unrepresentable_Domain: free text string 50 characters wide.

(5.11.7) Attribute:

(5.11.7.1) Attribute_Label: TABLE#ObsoleteTaxonomy. ObsoleteOrder_text50

(5.11.7.2) Attribute_Definition: Taxonomic level below class into which the species is categorized; not the currently accepted taxonomic order. All birds are members of class Aves.

(5.11.7.3) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012.

Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.

- (5.11.7.4) Attribute_Domain_Values:
 - (5.11.7.4.1) Enumerated_Domain:
 - (5.11.7.4.1) Enumerated_Domain: (not applicable)
 - (5.11.7.4.2) Range_Domain: (not applicable)
 - (5.11.7.4.3) Codeset_Domain: (not applicable)
 - (5.11.7.4.4) Unrepresentable_Domain: free text string 50 characters wide.
- (5.11.8) Attribute:
 - (5.11.8.1) Attribute_Label: TABLE#ObsoleteTaxonomy. ObsoleteFamily_text50
 - (5.11.8.2) Attribute_Definition: Taxonomic level below order into which the species is categorized; not the currently accepted taxonomic family. All orders are partitioned into families.
 - (5.11.8.3) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012.
Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.
 - (5.11.8.4) Attribute_Domain_Values:
 - (5.11.8.4.1) Enumerated_Domain:
 - (5.11.8.4.1) Enumerated_Domain: (not applicable)
 - (5.11.8.4.2) Range_Domain: (not applicable)
 - (5.11.8.4.3) Codeset_Domain: (not applicable)
 - (5.11.8.4.4) Unrepresentable_Domain: free text string 50 characters wide.
- (5.11.9) Attribute:
 - (5.11.9.1) Attribute_Label: TABLE# ObsoleteTaxonomy.DateChanged_meddate
 - (5.11.9.2) Attribute_Label_Definition: The date on which the noted changes were made to the species taxonomy as recorded in the Check-list of North American Birds and its Supplements produced by the American Ornithologists' Union.
 - (5.11.9.3) Attribute_Label_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012.
Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.
 - (5.11.9.4) Attribute_Domain_Values:
 - (5.11.9.4.1) Enumerated_Domain:
 - (5.11.9.4.1) Enumerated_Domain: (not applicable)
 - (5.11.9.4.2) Range_Domain: (not applicable)
 - (5.11.9.4.3) Codeset_Domain: (not applicable)
 - (5.11.9.4.4) Unrepresentable_Domain: medium Date Format
- (5.11.10) Attribute:
 - (5.11.10.1) Attribute_Label: TABLE# ObsoleteTaxonomy.Explanation_memo
 - (5.11.10.2) Attribute_Definition: A free text or comment field to provide any additional details about the change in taxonomy, such as merged/split species categories or other details.
 - (5.11.10.3) Attribute_Definition_Source: Citation: AOU. 2012. The American Ornithologists' Union Bird Species Check-list. The American Ornithologists'

Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at

<http://www.aou.org/checklist/north/full.php>. Accessed 20 November 2012.

Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.

- (5.11.10.4) Attribute_Domain_Values:
 - (5.11.10.4.1) Enumerated_Domain:
 - (5.11.10.4.1) Enumerated_Domain: (not applicable)
 - (5.11.8.10.2) Range_Domain: (not applicable)
 - (5.11.8.10.3) Codeset_Domain: (not applicable)
 - (5.11.8.10.4) Unrepresentable_Domain: free text string.

Comment2: Start the GIS-RELATED DATA LAYER TABLES INFORMATION

- (5.12) Overview_Description: GIS-RELATED DATA LAYER TABLES – the GIS Layer “MDNR Breeding Bird Atlas Block Layer” attribute table. (see Entity_Type_Definition in Section 5.12.1.2)
 - (5.12.1) Entity_Type: Feature Class or Shapefile (the data is provided in both formats)
 - (5.12.1.1) Entity_Type_Label: Michigan_BBA_Atlas_Blocks_polygons
 - (5.12.1.2) Entity_Type_Definition: The lines making up the rectangular grid system of quarter township-and-range blocks defined as MDNR Breeding Bird Atlas Blocks (approximately 3 miles by 3 miles, with notable variation both smaller and larger). Note: the order of the following data fields are listed for the ESRI software ArcGIS personal geodatabase format layer; however, the ESRI software “shapefile” format layer version has these same fields but they may appear in a different order or may not be seen by all software tools used to view the shapefile format data (for more details on both the ESRI personal geodatabase format or the shapefile format, see the software manufacture’s website at <http://www.esri.com>).
 - (5.12.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.
 - (5.12.2) Attribute:
 - (5.12.2.1) Attribute_Label: OBJECTID
 - (5.12.2.2) Attribute_Label_Definition: Object ID is a unique, system generated sequential integer value which is automatically generated for polygons in this attribute table. Values are a numeric handle. Considered one of four fields required in the software layer, and should not be managed by users.
 - (5.12.2.3) Attribute_Definition_Source: ESRI; ArcGIS version 10.1.
 - (5.12.2.4) Attribute_Domain_Values:
 - (5.12.2.4.1) Enumerated_Domain: (not applicable)
 - (5.12.2.4.2) Range_Domain:
 - (5.12.2.4.2.1) Range_Domain_Minimum: 0
 - (5.12.2.4.2.2) Range_Domain_Maximum: 11,199
 - (5.12.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
 - (5.12.3) Attribute:
 - (5.12.3.1) Attribute_Label: SHAPE
 - (5.12.3.2) Attribute_Label_Definition: Software generated field containing a description of arc type. Considered one of four fields required in the software layer, and should not be managed by users.
 - (5.12.3.3) Attribute_Definition_Source: ESRI; ArcGIS version 10.1.
 - (5.12.3.4) Attribute_Domain_Values:

- (5.12.3.4.1) Enumerated_Domain:
 - (5.12.3.4.1.1) Enumerated_Domain_Value: polygon
 - (5.12.3.4.1.2) Enumerated_Domain_Value_Definition: software generated definition of type of feature in vector-based GIS software.
 - (5.12.3.4.3) Enumerated_Domain_Value_Source: ESRI; ArcGIS version 10.1.
- (5.12.4) Attribute:
 - (5.12.4.1) Attribute_Label: SHAPE_AREA
 - (5.12.4.2) Attribute_Label_Definition: Software-calculated measure of polygon area of each polygon, in geographic units for the layer. In this data layer, these are units of square meters. Values are double-precision numeric values. Considered one of four fields required in the software layer, and should not be managed by users.
 - (5.12.4.3) Attribute_Definition_Source: ESRI; ArcGIS version 10.1.
 - (5.12.4.4) Attribute_Domain_Values:
 - (5.12.4.4.1) Enumerated_Domain: (not applicable)
 - (5.12.4.4.2) Range_Domain:
 - (5.12.4.4.2.1) Range_Domain_Minimum: 4.89656236209
 - (5.12.4.4.2.2) Range_Domain_Maximum: 39857094.4802000000
 - (5.12.4.5) Attribute_Units_of_Measure: square meters.
- (5.12.5) Attribute:
 - (5.12.5.1) Attribute_Label: SHAPE_LENGTH
 - (5.12.5.2) Attribute_Label_Definition: Software-calculated measure of polygon perimeter or length of outer edge of each polygon in geographic units for the layer. In this data layer, these are units of linear meters. Values are double-precision numeric values. Considered one of four fields required in the software layer, and should not be managed by users.
 - (5.12.5.3) Attribute_Definition_Source: ESRI; ArcGIS version 10.1.
 - (5.12.5.4) Attribute_Domain_Values:
 - (5.12.5.4.1) Enumerated_Domain: (not applicable)
 - (5.12.5.4.2) Range_Domain:
 - (5.12.4.4.2.1) Range_Domain_Minimum: 10.638305116100
 - (5.12.4.4.2.2) Range_Domain_Maximum: 25487.93465690000
 - (5.12.5.5) Attribute_Units_of_Measure: meters.
- (5.12.6) Attribute:
 - (5.12.6.1) Attribute_Label: ST
 - (5.12.6.2) Attribute_Label_Definition: A two character text field containing the value for the State of the Breeding Bird Atlas Block, using the two-character text label standard for the United States Postal Service code. For Michigan, the value is "MI".
 - (5.12.6.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.12.6.4) Attribute_Domain_Values:
 - (5.12.6.4.1) Enumerated_Domain:
 - (5.12.6.4.1.1) Enumerated_Domain_Value: MI
 - (5.12.6.4.1.2) Enumerated_Domain_Value_Definition: Michigan, i.e., the State of Michigan. Comment; field used if or when blocks combined in great lakes regional area, etc.
 - (5.12.6.4.3) Enumerated_Domain_Value_Source: USPS.

- (5.12.7) Attribute:
 - (5.12.7.1) Attribute_Label: STATE
 - (5.12.7.2) Attribute_Label_Definition: State, a ten character text field containing a description of the State, using the official name of State as set as standard for the US Postal Service, names of States in the United States.
 - (5.12.7.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.12.7.4) Attribute_Domain_Values:
 - (5.12.7.4.1) Enumerated_Domain:
 - (5.12.7.4.1.1) Enumerated_Domain_Value: Michigan
 - (5.12.7.4.1.2) Enumerated_Domain_Value_Definition: Michigan, i.e., the State of Michigan. Comment; field used if or when blocks combined in great lakes regional area, etc.
 - (5.12.7.4.3) Enumerated_Domain_Value_Source: USPS.
- (5.12.8) Attribute:
 - (5.12.8.1) Attribute_Label: UP_LP
 - (5.12.8.2) Attribute_Label_Definition: A 20 character text field containing the label for the peninsula of the State of Michigan in which the block lies. The geographic barrier between the two peninsulas is Lake Michigan, Lake Huron, and the Straits of Mackinac.
 - (5.12.8.3) Attribute_Definition_Source: Michigan Department of Natural Resources.
 - (5.12.8.4) Attribute_Domain_Values:
 - (5.12.8.4.1.1) Enumerated_Domain_Value: identifies the the two Michigan peninsulas of “upper peninsula” and lower peninsula”.
 - (5.12.7.8.1.2) Enumerated_Domain_Value_Definition: Michigan peninsulas of “upper peninsula” are north of the confluence of the NE Lake Michigan flowing into the NW portion of Lake Huron, at the Straits of Mackinac. Comment: used for expected regional grouping or queries of data.
 - * Enumerated_Domain:
 - Enumerated_Domain_Value: upper peninsula
 - Enumerated_Domain_Value_Definition: the upper peninsula of Michigan is defined as all portions of the State of Michigan north of the Straits of Mackinac where Lake Michigan flows into Lake Huron.
 - * Enumerated_Domain:
 - Enumerated_Domain_Value: lower peninsula
 - Enumerated_Domain_Value_Definition: the lower peninsula of Michigan is defined as all portions of the State of Michigan south of the Straits of Mackinac where Lake Michigan flows into Lake Huron.
 - (5.12.7.8.3) Enumerated_Domain_Value_Source: Michigan Department of Natural Resources.
(as follows:)
 - (5.12.9) Attribute:
 - (5.12.9.1) Attribute_Label: COUNTY_MAJ
 - (5.12.9.1) Attribute_Label_Definition: County of Majority of the polygon; a 25 character text field containing the political name of the county within the State of Michigan, representing the membership of that BBA Block to just one Michigan County, based on the majority of area in situations where a BBA Block contains portions of more than one County.

(5.12.9.1) Attribute_Label_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.

(5.12.9.1) Attribute_Domain_Values:

(5.12.9.1.1) Enumerated_Domain:

(5.12.9.1.1.1) Enumerated_Domain_Value: Alcona – Wexford (or the name of each of 83 Michigan counties).

(as follows:)

Enumerated_Domain_Value: Alcona
Enumerated_Domain_Value: Alger
Enumerated_Domain_Value: Allegan
Enumerated_Domain_Value: Alpena
Enumerated_Domain_Value: Antrim
Enumerated_Domain_Value: Arenac
Enumerated_Domain_Value: Baraga
Enumerated_Domain_Value: Barry
Enumerated_Domain_Value: Bay
Enumerated_Domain_Value: Benzie
Enumerated_Domain_Value: Berrien
Enumerated_Domain_Value: Branch
Enumerated_Domain_Value: Calhoun
Enumerated_Domain_Value: Cass
Enumerated_Domain_Value: Charlevoix
Enumerated_Domain_Value: Cheboygan
Enumerated_Domain_Value: Chippewa
Enumerated_Domain_Value: Clare
Enumerated_Domain_Value: Clinton
Enumerated_Domain_Value: Crawford
Enumerated_Domain_Value: Delta
Enumerated_Domain_Value: Dickinson
Enumerated_Domain_Value: Eaton
Enumerated_Domain_Value: Emmet
Enumerated_Domain_Value: Genesee
Enumerated_Domain_Value: Gladwin
Enumerated_Domain_Value: Gogebic
Enumerated_Domain_Value: Grand Traverse
Enumerated_Domain_Value: Gratiot
Enumerated_Domain_Value: Hillsdale
Enumerated_Domain_Value: Houghton
Enumerated_Domain_Value: Huron
Enumerated_Domain_Value: Ingham
Enumerated_Domain_Value: Ionia
Enumerated_Domain_Value: Iosco
Enumerated_Domain_Value: Iron
Enumerated_Domain_Value: Isabella
Enumerated_Domain_Value: Jackson
Enumerated_Domain_Value: Kalamazoo
Enumerated_Domain_Value: Kalkaska
Enumerated_Domain_Value: Kent

Enumerated_Domain_Value: Keweenaw
Enumerated_Domain_Value: Lake
Enumerated_Domain_Value: Lapeer
Enumerated_Domain_Value: Leelanau
Enumerated_Domain_Value: Lenawee
Enumerated_Domain_Value: Livingston
Enumerated_Domain_Value: Luce
Enumerated_Domain_Value: Mackinac
Enumerated_Domain_Value: Macomb
Enumerated_Domain_Value: Manistee
Enumerated_Domain_Value: Marquette
Enumerated_Domain_Value: Mason
Enumerated_Domain_Value: Mecosta
Enumerated_Domain_Value: Menominee
Enumerated_Domain_Value: Midland
Enumerated_Domain_Value: Missaukee
Enumerated_Domain_Value: Monroe
Enumerated_Domain_Value: Montcalm
Enumerated_Domain_Value: Montmorency
Enumerated_Domain_Value: Muskegon
Enumerated_Domain_Value: Newaygo
Enumerated_Domain_Value: Oakland
Enumerated_Domain_Value: Oceana
Enumerated_Domain_Value: Ogemaw
Enumerated_Domain_Value: Ontonagon
Enumerated_Domain_Value: Osceola
Enumerated_Domain_Value: Oscoda
Enumerated_Domain_Value: Otsego
Enumerated_Domain_Value: Ottawa
Enumerated_Domain_Value: Presque Isle
Enumerated_Domain_Value: Roscommon
Enumerated_Domain_Value: Saginaw
Enumerated_Domain_Value: Sanilac
Enumerated_Domain_Value: Schoolcraft
Enumerated_Domain_Value: Shiawassee
Enumerated_Domain_Value: St. Clair
Enumerated_Domain_Value: St. Joseph
Enumerated_Domain_Value: Tuscola
Enumerated_Domain_Value: Van Buren
Enumerated_Domain_Value: Washtenaw
Enumerated_Domain_Value: Wayne
Enumerated_Domain_Value: Wexford

(5.12.9.1.1.2) Enumerated_Domain_Value_Definition: value represents the County in Michigan of the same name, with exception of (a.) Saint Clair (or St. Clair, if Saint is abbreviated) County, Michigan; and (b.) Saint Joseph (or St. Joseph, if Saint is abbreviated) County, Michigan.

(5.12.9.1.1.3) Enumerated_Domain_Value_Definition_Source: USPS.

(5.12.10) Attribute:

(5.12.10.1) Attribute_Label: TOWN

(5.12.10.2) Attribute_Label_Definition: A three character text field containing the town or tier grid identifier values for the PLSS grid system for that polygon,

where Michigan values range from “09S” to 01S” then (there is no “0S” , “00” or “0N”) from “01N” to “68N” where the S denotes south and N denotes north of the State’s baseline for the PLSS in Michigan.

- (5.12.10.3) Attribute_Definition_Source: The Michigan PLSS is a specific set of information about the PLSS irregular grid system for the State of Michigan. The Michigan geospatial data comes from the source: MGD.L. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online at <http://www.mcgi.state.mi.us/mgd.l>. Accessed 11 October 2014. The PLSS is structured according to the standards and practices from the citation: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov ; online at <http://www.blmsurveymanual.org/index.html> . Accessed 20 November 2012
- (5.12.10.4) Attribute_Domain_Values:
 - (5.12.10.4.1) Enumerated_Domain: (not applicable)
 - (5.12.10.4.2) Range_Domain: (not applicable)
 - (5.12.10.4.3) Codeset_Domain:
 - (5.12.10.4.3.1) Codeset_Name: town or tier grid identifier values.
 - (5.12.10.4.3.2) Codeset_Source: Michigan PLSS.
- (5.12.11) Attribute:
 - (5.12.11.1) Attribute_Label: RANGE
 - (5.12.11.2) Attribute_Label_Definition: A three character text field containing the range grid identifier values for the PLSS grid system for that polygon, where Michigan values range from “20E” to 01E” then (there is no “0E” , “00” or “0W”) from “01W” to “49W” where the E denotes east and W denotes west of the State’s meridian for the PLSS in Michigan.
 - (5.12.11.3) Attribute_Definition_Source: The Michigan PLSS is a specific set of information about the PLSS irregular grid system for the State of Michigan. The Michigan geospatial data comes from the source: MGD.L. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online at <http://www.mcgi.state.mi.us/mgd.l>. Accessed 11 October 2014. The PLSS is structured according to the standards and practices from the citation: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov; online at <http://www.blmsurveymanual.org/index.html> . Accessed 20 November 2012
 - (5.12.11.4) Attribute_Domain_Values:
 - (5.12.11.4.1) Enumerated_Domain: (not applicable)
 - (5.12.11.4.2) Range_Domain: (not applicable)
 - (5.12.11.4.3) Codeset_Domain:
 - (5.12.11.4.3.1) Codeset_Name: range grid identifier values.
 - (5.12.11.4.3.2) Codeset_Source: Michigan PLSS.
- (5.12.12) Attribute:

- (5.12.12.1) Attribute_Label: TOWNRANGE
- (5.12.12.2) Attribute_Label_Definition: An six character text field containing the concatenated value for town(or tier) and range values for the grid identifier for the PLSS grid system for that polygon in Michigan. Values are composed of the appropriate town values, where Michigan values range from “09S” to 01S” then (there is no “0S” , “00” or “0N”) from “01N” to “68N” where the S denotes south and N denotes north of the State’s baseline for the PLSS in Michigan and the appropriate range values, where Michigan values range from “20E” to 01E” then (there is no “0E” , “00” or “0W”) from “01W” to “49W” where the E denotes east and W denotes west of the State’s meridian for the PLSS in Michigan.
- (5.12.12.3) Attribute_Definition_Source: The Michigan PLSS is is a specific set of information about the PLSS irregular grid system for the State of Michigan. The Michigan geospatial data comes from the source: MGD. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online at <http://www.mcgi.state.mi.us/mgd>. Accessed 11 October 2014. The PLSS is structured according to the standards and practices from the citation: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov; online at <http://www.blmsurveymanual.org/index.html> . Accessed 20 November 2012.
- (5.12.12.4) Attribute_Domain_Values:
 - (5.12.12.4.1) Enumerated_Domain: (not applicable)
 - (5.12.12.4.2) Range_Domain: (not applicable)
 - (5.12.12.4.3) Codeset_Domain: (not applicable)
 - (5.12.12.4.4) Unrepresentable_Domain: The concatenation of the town and range PLSS values creates 2,883 unique combinations of town and range grid identifier values which are listed (per polygon) in the fields TOWN and RANGE. These values themselves are from a codeset:
 - Codeset_Name: town and range grid identifier values.
 - Codeset_Source: Michigan PLSS.
- (5.12.13) Attribute:
 - (5.12.13.1) Attribute_Label: TOWN_RANGE
 - (5.12.13.2) Attribute_Label_Definition: An eight character text field containing the concatenated value for town(or tier) and range values for the grid identifier for the PLSS grid system for that polygon in Michigan. Values are composed of a “T” followed by the appropriate town values, where Michigan values range from “09S” to 01S” then (there is no “0S” , “00” or “0N”) from “01N” to “68N” where the S denotes south and N denotes north of the State’s baseline for the PLSS in Michigan and an “R” followed by the appropriate range values, where Michigan values range from “20E” to 01E” then (there is no “0E” , “00” or “0W”) from “01W” to “49W” where the E denotes east and W denotes west of the State’s meridian for the PLSS in Michigan. This field differs from the earlier field TOWNRANGE by addition of the “T” and “R” before the respective town and range values in the concatenated string to identify the PLSS grid location of the specific polygon.
 - (5.12.13.3) Attribute_Definition_Source: The Michigan PLSS is is a specific set of information about the PLSS irregular grid system for the State of Michigan. The

Michigan geospatial data comes from the source: MGD. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online at <http://www.mcgi.state.mi.us/mgd>. Accessed 11 October 2014. The PLSS is structured according to the standards and practices from the citation: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov; online at <http://www.blmsurveymanual.org/index.html> . Accessed 20 November 2012

(5.12.13.4) Attribute_Domain_Values:

(5.12.13.4.1) Enumerated_Domain: (not applicable)

(5.12.13.4.2) Range_Domain: (not applicable)

(5.12.13.4.3) Codeset_Domain: (not applicable)

(5.12.13.4.4) Unrepresentable_Domain: The concatenation of the town and range PLSS values creates 2,883 unique combinations of town and range grid identifier values which are listed (per polygon) in the fields TOWN and RANGE. These values themselves are from a codeset:

Codeset_Name: town and range grid identifier values.

Codeset_Source: Michigan PLSS.

(5.12.14) Attribute:

(5.12.14.1) Attribute_Label: BLOCKCODE

(5.12.14.2) Attribute_Label_Definition: Michigan Breeding Bird Atlas Block code value; a single character text field containing the Breeding Bird Atlas Block code label, as specified in Figure 5 and Section 2.5.2.d. (or Process step “D”).

(5.12.14.3) Attribute_Definition_Source: BBA1 and BBA2

(5.12.14.4) Attribute_Domain_Values:

(5.12.14.4.1) Enumerated_Domain:

(5.12.14.4.1.1) Enumerated_Domain_Value: 1, 2, 3, 4 or 0 (no data)

(5.12.14.4.1.2) Enumerated_Domain_Value_Definition: Identifies the quarter-township block where 1 is in northeast, 2 is in northwest, 3 is in southwest, and 4 is in southeast.

(as follows:)

* Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: BBA Block one (1) of a town-range block is the northeastern quarter of the town-range block, and, if a complete town-range block with 36 sections, is composed of sections 1-3 and 10-15.

* Enumerated_Domain:

Enumerated_Domain_Value: 2

Enumerated_Domain_Value_Definition: BBA Block two(2) of a town-range block is the northwestern quarter of the town-range block, and, if a complete town-range block with 36 sections, is composed of sections 4-9, and 16-18.

* Enumerated_Domain:

Enumerated_Domain_Value: 3

Enumerated_Domain_Value_Definition: BBA Block three (3) of a town-range block is the southwestern quarter of the town-range block, and,

if a complete town-range block with 36 sections, is composed of sections 19-21 and 28-33.

* Enumerated_Domain:

Enumerated_Domain_Value: 4

Enumerated_Domain_Value_Definition: BBA Block four (4) of a town-range block is the southeastern quarter of the town-range block, and, if a complete town-range block with 36 sections, is composed of sections 22-27 and 33-36.

(5.12.14.4.1.3) Enumerated_Domain_Value_Source: Kalamazoo Nature Center, BBA1 and BBA2.

(5.12.15) Attribute:

(5.12.15.1) Attribute_Label: BBA_BLOCK

(5.12.15.2) Attribute_Label_Definition: A single digit number field containing the Michigan Breeding Bird Atlas Block code value as specified in Figure 5 and Section 2.5.2.d. (or Process step “D”).

(5.12.15.3) Attribute_Definition_Source: BBA1 and BBA2

(5.12.15.4) Attribute_Domain_Values:

(5.12.15.4.1.1) Enumerated_Domain_Value: 1, 2, 3, 4 or 0 (no data)

(5.12.15.4.1.2) Enumerated_Domain_Value_Definition: Identifies the quarter-township block where 1 is in northeast, 2 is in northwest, 3 is in southwest, and 4 is in southeast.

(as follows:)

* Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: BBA Block one (1) of a town-range block is the northeastern quarter of the town-range block, and, if a complete town-range block with 36 sections, is composed of sections 1-3 and 10-15.

* Enumerated_Domain:

Enumerated_Domain_Value: 2

Enumerated_Domain_Value_Definition: BBA Block two(2) of a town-range block is the northwestern quarter of the town-range block, and, if a complete town-range block with 36 sections, is composed of sections 4-9, and 16-18.

* Enumerated_Domain:

Enumerated_Domain_Value: 3

Enumerated_Domain_Value_Definition: BBA Block three (3) of a town-range block is the southwestern quarter of the town-range block, and, if a complete town-range block with 36 sections, is composed of sections 19-21 and 28-33.

* Enumerated_Domain:

Enumerated_Domain_Value: 4

Enumerated_Domain_Value_Definition: BBA Block four (4) of a town-range block is the southeastern quarter of the town-range block, and, if a complete town-range block with 36 sections, is composed of sections 22-27 and 33-36.

(5.12.15.4.1.3) Enumerated_Domain_Value_Source: Kalamazoo Nature Center, BBA1 and BBA2.

(5.12.15.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.

(5.12.16) Attribute:

(5.12.16.1) Attribute_Label: BBA_TRBLC

(5.12.16.2) Attribute_Label_Definition: Michigan Breeding Bird Atlas Block code – short version; a seven character text field containing the concatenated value for town(or tier) and range values for the grid identifier for the PLSS grid system for that polygon in Michigan, with the BBA Block code. Values are composed of the appropriate town values, where Michigan values range from “09S” to 01S” then (there is no “0S” , “00” or “0N”) from “01N” to “68N” where the S denotes south and N denotes north of the State’s baseline for the PLSS in Michigan, the appropriate range values, where Michigan values range from “20E” to 01E” then (there is no “0E” , “00” or “0W”) from “01W” to “49W” where the E denotes east and W denotes west of the State’s meridian for the PLSS in Michigan, and the BBA Block code values of 1-4. Note: this field differs from the “longer version” in field BBA_TRBLOC by not having the “T” for Town or “R” for Range value identifiers in the town-range block identification portion before the BBA Block code value.

(5.12.16.3) Attribute_Definition_Source: BBA1 and BBA2.

(5.12.16.4) Attribute_Domain_Values:

(5.12.16.4.1) Enumerated_Domain: (not applicable)

(5.12.16.4.2) Range_Domain: (not applicable)

(5.12.16.4.3) Codeset_Domain: (not applicable)

(5.12.16.4.4) Unrepresentable_Domain: The concatenation of the town and range PLSS values with BBA Block Code values create 11,193 unique combinations of identifier values which are listed (per polygon) in the fields TOWN and RANGE, and BBA_BLOCKCODE.

(5.12.17) Attribute:

(5.12.17.1) Attribute_Label: BBA_TRBLOC

(5.12.17.2) Attribute_Label_Definition: Michigan Breeding Bird Atlas Block code – longer version; a n nine character text field containing the concatenated value for town (or tier) and range values for the grid identifier for the PLSS grid system, with BBA Block Code values, for that polygon in Michigan. Values are composed of a “T” (for town or tier), the appropriate PLSS town or tier values, where Michigan values range from “09S” to 01S” then (there is no “0S” , “00” or “0N”) from “01N” to “68N” where the S denotes south and N denotes north of the State’s baseline for the PLSS in Michigan, an “R” (for range), the appropriate PLSS range values, where Michigan values range from “20E” to 01E” then (there is no “0E” , “00” or “0W”) from “01W” to “49W” where the E denotes east and W denotes west of the State’s meridian for the PLSS in Michigan, and value for BBA Block which is 1-4. Note: this field differs from the “short version” in field BBA_TRBLC by having the “T” for Town or “R” for Range value identifiers in the town-range block identification portion before the BBA Block code value.

(5.12.17.3) Attribute_Definition_Source: BBA1 and BBA2.

(5.12.17.4) Attribute_Domain_Values:

(5.12.17.4.1) Enumerated_Domain: (not applicable)

(5.12.17.4.2) Range_Domain: (not applicable)

(5.12.17.4.3) Codeset_Domain: (not applicable)

(5.12.17.4.4) Unrepresentable_Domain: The concatenation of the town and range PLSS values with BBA Block Code values create 11,193 unique combinations of identifier values which are listed in the fields TOWN and RANGE, and BBA_BLOCKCODE.

(5.12.18) Attribute:

(5.12.18.1) Attribute_Label: BLC_SOURCE

(5.12.18.2) Attribute_Label_Definition: Block source label or the Michigan Breeding Bird Atlas Block source label; a 20 character text field containing the data layer developer's statement about source of that block in simple statement of one of three clauses: (a.) "PLSS Sections, all", (b.) "PLSS Sections, part", or (c.) "PLSS projected".

(5.12.18.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

(5.12.18.4) Attribute_Domain_Values:

(5.12.18.4.1) Enumerated_Domain:

(5.12.18.4.1.1) Enumerated_Domain_Value: (as follows, below).

(5.12.18.4.1.2) Enumerated_Domain_Value_Definition:
(as follows:)

* Enumerated_Domain:

Enumerated_Domain_Value: PLSS Sections, all

Enumerated_Domain_Value_Definition: the labeled polygon was created from complete (all 36) sections for that area's town-range block; no extrapolation, extension or projection of PLSS grid lines.

* Enumerated_Domain:

Enumerated_Domain_Value: PLSS Sections, part

Enumerated_Domain_Value_Definition: the labeled polygon was created from a partial (less than 36) set of sections for that area's town-range block; some extrapolation, extension or projection of PLSS grid lines.

* Enumerated_Domain:

Enumerated_Domain_Value: PLSS projected

Enumerated_Domain_Value_Definition: the labeled polygon was created from some extrapolation, extension or projection of PLSS grid lines.

(5.12.18.4.1.3) Enumerated_Domain_Value_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

(5.12.19) Attribute:

(5.12.19.1) Attribute_Label: BLC_SOURC2

(5.12.19.2) Attribute_Label_Definition: Michigan Breeding Bird Atlas Block source description; a 100 character text field containing a statement about the source of that block.

(5.12.19.3) Attribute_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

(5.12.19.4) Attribute_Domain_Values:

(5.12.19.4.1) Enumerated_Domain:

(5.12.19.4.1.1) Enumerated_Domain_Value: (as follows, below).

(5.12.19.4.1.2) Enumerated_Domain_Value_Definition:
(as follows:)

* Enumerated_Domain:

Enumerated_Domain_Value: "completed entire block with PLSS sections (all block); highest confidence in location"

Enumerated_Domain_Value_Definition: the labeled polygon was "completed entire block with PLSS sections (all block); highest confidence in location".

* Enumerated_Domain:

Enumerated_Domain_Value: "completed block with PLSS sections (part of block); high confidence in location"

Enumerated_Domain_Value_Definition: the labeled polygon was “completed block with PLSS sections (part of block); high confidence in location”.

* Enumerated_Domain:

Enumerated_Domain_Value: “created block by connecting PLSS grid/ sections (part); moderately high confidence in location”

Enumerated_Domain_Value_Definition: the labeled polygon was “created block by connecting PLSS grid/ sections (part); moderately high confidence in location”.

* Enumerated_Domain:

Enumerated_Domain_Value: “created block by extended/ extrapolated PLSS grid for blocks; moderate/good confidence in location”

Enumerated_Domain_Value_Definition: the labeled polygon was “created block by extended/ extrapolated PLSS grid for blocks; moderate/good confidence in location”.

(5.12.19.4.1.3) Enumerated_Domain_Value_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

(5.13) Overview_Description: GIS-RELATED DATA LAYER TABLES – the GIS Layer “Breeding Bird Atlas Projected TR Block Layer” attribute table. (see Entity_Type_Definition in Section 5.13.1.2)

(5.13.1) Entity_Type: Feature Class or Shapefile (the data is provided in both formats)

(5.13.1.1) Entity_Type_Label: Michigan_BBA_projected_TR_blocks_polygons

(5.13.1.2) Entity_Type_Definition: The lines making up the rectangular grid system of township and range blocks, projected across the entire State of Michigan; note that these are not BBA Atlas Blocks but conform to a more standard town-range block size of 6 miles by 6 miles (approximate) as described in the Public Land Survey System. Note: the order of the following data fields are listed for the ESRI software ArcGIS personal geodatabase format layer; however, the ESRI software “shapefile” format layer version has these same fields but they may appear in a different order or may not be seen by all software tools used to view the shapefile format data.

(5.13.1.3) Entity_Type_Definition_Source: MDNR Wildlife Division Combo-BBA1-2 Project.

(5.13.2) Attribute:

(5.13.2.1) Attribute_Label: OBJECTID

(5.13.2.2) Attribute_Label_Definition: Object ID is a unique, system generated sequential integer value which is automatically generated for polygons in this attribute table. Values are a digital numeric handle. Considered one of four fields required in the software layer, and should not be managed by users.

(5.13.2.3) Attribute_Definition_Source: ESRI; ArcGIS version 10.1.

(5.13.2.4) Attribute_Domain_Values:

(5.13.2.4.1) Enumerated_Domain: (not applicable)

(5.13.2.4.2) Range_Domain:

(5.13.2.4.2.1) Range_Domain_Minimum: 0

(5.13.2.4.2.2) Range_Domain_Maximum: 2890

(5.13.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.

(5.13.3) Attribute:

(5.13.3.1) Attribute_Label: SHAPE

- (5.13.3.2) **Attribute_Label_Definition:** Software generated field containing a description of arc type. Considered one of four fields required in the software layer, and should not be managed by users.
- (5.13.3.3) **Attribute_Definition_Source:** ESRI; ArcGIS version 10.1.
- (5.13.3.4) **Attribute_Domain_Values:**
 - (5.13.3.4.1) **Enumerated_Domain:**
 - (5.13.3.4.1.1) **Enumerated_Domain_Value:** polygon
 - (5.13.3.4.1.2) **Enumerated_Domain_Value_Definition:** software generated definition of type of feature in vector-based GIS software.
 - (5.13.3.4.3) **Enumerated_Domain_Value_Source:** ESRI; ArcGIS version 10.1.
- (5.13.4) **Attribute:**
 - (5.13.4.1) **Attribute_Label:** SHAPE_AREA
 - (5.13.4.2) **Attribute_Label_Definition:** Software-calculated measure of polygon area of each polygon, in geographic units for the layer. In this data layer, these are units of square meters. Values are double-precision numeric values. Considered one of four fields required in the software layer, and should not be managed by users.
 - (5.13.4.3) **Attribute_Definition_Source:** ESRI; ArcGIS version 10.1.
 - (5.13.4.4) **Attribute_Domain_Values:**
 - (5.13.4.4.1) **Enumerated_Domain:** (not applicable)
 - (5.13.4.4.2) **Range_Domain:**
 - (5.13.4.4.2.1) **Range_Domain_Minimum:** 11.982593961100
 - (5.13.4.4.2.2) **Range_Domain_Maximum:** 124979984.206000000000
 - (5.13.4.5) **Attribute_Units_of_Measure:** square meters.
- (5.13.5) **Attribute:**
 - (5.13.5.1) **Attribute_Label:** SHAPE_LENGTH
 - (5.13.5.2) **Attribute_Label_Definition:** Software-calculated measure of polygon perimeter or length of outer edge of each polygon in geographic units for the layer. In this data layer, these are units of linear meters. Values are double-precision numeric values. Considered one of four fields required in the software layer, and should not be managed by users.
 - (5.13.5.3) **Attribute_Definition_Source:** ESRI; ArcGIS version 10.1.
 - (5.13.5.4) **Attribute_Domain_Values:**
 - (5.13.5.4.1) **Enumerated_Domain:** (not applicable)
 - (5.13.5.4.2) **Range_Domain:**
 - (5.13.4.4.2.1) **Range_Domain_Minimum:** 104.15190147500
 - (5.13.4.4.2.2) **Range_Domain_Maximum:** 47712.83146550000
 - (5.13.5.5) **Attribute_Units_of_Measure:** meters.
- (5.13.6) **Attribute:**
 - (5.13.6.1) **Attribute_Label:** ST
 - (5.13.6.2) **Attribute_Label_Definition:** A two character text field containing the value for the State of the Breeding Bird Atlas Block, using the two-character text label standard for the United States Postal Service code. For Michigan, the value is "MI".
 - (5.13.6.3) **Attribute_Definition_Source:** USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.13.6.4) **Attribute_Domain_Values:**
 - (5.13.6.4.1) **Enumerated_Domain:**

- (5.13.6.4.1.1) Enumerated_Domain_Value: MI
- (5.13.6.4.1.2) Enumerated_Domain_Value_Definition: Michigan, i.e., the State of Michigan. Comment; field used if or when blocks combined in great lakes regional area, etc.
- (5.13.6.4.3) Enumerated_Domain_Value_Source: USPS.
- (5.13.7) Attribute:
 - (5.13.7.1) Attribute_Label: STATE
 - (5.13.7.2) Attribute_Label_Definition: State, a ten character text field containing a description of the State, using the official name of State as set as standard for the US Postal Service, names of States in the United States.
 - (5.13.7.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.13.7.4) Attribute_Domain_Values:
 - (5.13.7.4.1) Enumerated_Domain:
 - (5.13.7.4.1.1) Enumerated_Domain_Value: Michigan
 - (5.13.7.4.1.2) Enumerated_Domain_Value_Definition: Michigan, i.e., the State of Michigan. Comment; field used if or when blocks combined in great lakes regional area, etc.
 - (5.13.7.4.3) Enumerated_Domain_Value_Source: USPS.
- (5.13.8) Attribute:
 - (5.13.8.1) Attribute_Label: UP_LP
 - (5.13.8.2) Attribute_Label_Definition: A 20 character text field containing the label for the peninsula of the State of Michigan in which the block lies. The geographic barrier between the two peninsulas is Lake Michigan, Lake Huron, and the Straits of Mackinac.
 - (5.13.8.3) Attribute_Definition_Source: Michigan Department of Natural Resources.
 - (5.13.8.4) Attribute_Domain_Values:
 - (5.13.8.4.1.1) Enumerated_Domain_Value: identifies the the two Michigan peninsulas of “upper peninsula” and lower peninsula”.
 - (5.13.7.8.1.2) Enumerated_Domain_Value_Definition: Michigan peninsulas of “upper peninsula” are north of the confluence of the NE Lake Michigan flowing into the NW portion of Lake Huron, at the Straits of Mackinac. Comment: used for expected regional grouping or queries of data.
 - * Enumerated_Domain:
 - Enumerated_Domain_Value: upper peninsula
 - Enumerated_Domain_Value_Definition: the upper peninsula of Michigan is defined as all portions of the State of Michigan north of the Straits of Mackinac where Lake Michigan flows into Lake Huron.
 - * Enumerated_Domain:
 - Enumerated_Domain_Value: lower peninsula
 - Enumerated_Domain_Value_Definition: the lower peninsula of Michigan is defined as all portions of the State of Michigan south of the Straits of Mackinac where Lake Michigan flows into Lake Huron.
 - (5.13.7.8.3) Enumerated_Domain_Value_Source: Michigan Department of Natural Resources.
(as follows:)
 - (5.13.9) Attribute:
 - (5.13.9.1) Attribute_Label: COUNTY_MAJ

- (5.13.9.1) Attribute_Label_Definition: County of Majority of the polygon; a 25 character text field containing the political name of the county within the State of Michigan, representing the membership of that BBA Block to just one Michigan County, based on the majority of area in situations where a BBA Block contains portions of more than one County.
- (5.13.9.1) Attribute_Label_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
- (5.13.9.1) Attribute_Domain_Values:
 - (5.13.9.1.1) Enumerated_Domain:
 - (5.13.9.1.1.1) Enumerated_Domain_Value: Alcona – Wexford (or the name of each of 83 Michigan counties).
(as follows:)
 - Enumerated_Domain_Value: Alcona
 - Enumerated_Domain_Value: Alger
 - Enumerated_Domain_Value: Allegan
 - Enumerated_Domain_Value: Alpena
 - Enumerated_Domain_Value: Antrim
 - Enumerated_Domain_Value: Arenac
 - Enumerated_Domain_Value: Baraga
 - Enumerated_Domain_Value: Barry
 - Enumerated_Domain_Value: Bay
 - Enumerated_Domain_Value: Benzie
 - Enumerated_Domain_Value: Berrien
 - Enumerated_Domain_Value: Branch
 - Enumerated_Domain_Value: Calhoun
 - Enumerated_Domain_Value: Cass
 - Enumerated_Domain_Value: Charlevoix
 - Enumerated_Domain_Value: Cheboygan
 - Enumerated_Domain_Value: Chippewa
 - Enumerated_Domain_Value: Clare
 - Enumerated_Domain_Value: Clinton
 - Enumerated_Domain_Value: Crawford
 - Enumerated_Domain_Value: Delta
 - Enumerated_Domain_Value: Dickinson
 - Enumerated_Domain_Value: Eaton
 - Enumerated_Domain_Value: Emmet
 - Enumerated_Domain_Value: Genesee
 - Enumerated_Domain_Value: Gladwin
 - Enumerated_Domain_Value: Gogebic
 - Enumerated_Domain_Value: Grand Traverse
 - Enumerated_Domain_Value: Gratiot
 - Enumerated_Domain_Value: Hillsdale
 - Enumerated_Domain_Value: Houghton
 - Enumerated_Domain_Value: Huron
 - Enumerated_Domain_Value: Ingham
 - Enumerated_Domain_Value: Ionia
 - Enumerated_Domain_Value: Iosco
 - Enumerated_Domain_Value: Iron

Enumerated_Domain_Value: Isabella
Enumerated_Domain_Value: Jackson
Enumerated_Domain_Value: Kalamazoo
Enumerated_Domain_Value: Kalkaska
Enumerated_Domain_Value: Kent
Enumerated_Domain_Value: Keweenaw
Enumerated_Domain_Value: Lake
Enumerated_Domain_Value: Lapeer
Enumerated_Domain_Value: Leelanau
Enumerated_Domain_Value: Lenawee
Enumerated_Domain_Value: Livingston
Enumerated_Domain_Value: Luce
Enumerated_Domain_Value: Mackinac
Enumerated_Domain_Value: Macomb
Enumerated_Domain_Value: Manistee
Enumerated_Domain_Value: Marquette
Enumerated_Domain_Value: Mason
Enumerated_Domain_Value: Mecosta
Enumerated_Domain_Value: Menominee
Enumerated_Domain_Value: Midland
Enumerated_Domain_Value: Missaukee
Enumerated_Domain_Value: Monroe
Enumerated_Domain_Value: Montcalm
Enumerated_Domain_Value: Montmorency
Enumerated_Domain_Value: Muskegon
Enumerated_Domain_Value: Newaygo
Enumerated_Domain_Value: Oakland
Enumerated_Domain_Value: Oceana
Enumerated_Domain_Value: Ogemaw
Enumerated_Domain_Value: Ontonagon
Enumerated_Domain_Value: Osceola
Enumerated_Domain_Value: Oscoda
Enumerated_Domain_Value: Otsego
Enumerated_Domain_Value: Ottawa
Enumerated_Domain_Value: Presque Isle
Enumerated_Domain_Value: Roscommon
Enumerated_Domain_Value: Saginaw
Enumerated_Domain_Value: Sanilac
Enumerated_Domain_Value: Schoolcraft
Enumerated_Domain_Value: Shiawassee
Enumerated_Domain_Value: St. Clair
Enumerated_Domain_Value: St. Joseph
Enumerated_Domain_Value: Tuscola
Enumerated_Domain_Value: Van Buren
Enumerated_Domain_Value: Washtenaw
Enumerated_Domain_Value: Wayne
Enumerated_Domain_Value: Wexford

(5.13.9.1.1.2) Enumerated_Domain_Value_Definition: value represents the County in Michigan of the same name, with exception of (a.) Saint Clair (or St. Clair, if Saint is abbreviated) County, Michigan; and (b.) Saint Joseph (or St. Joseph, if Saint is abbreviated) County, Michigan.

- (5.13.9.1.1.3) Enumerated_Domain_Value_Definition_Source: USPS.
- (5.13.10) Attribute:
 - (5.13.10.1) Attribute_Label: TOWN
 - (5.13.10.2) Attribute_Label_Definition: A three character text field containing the town or tier grid identifier values for the PLSS grid system for that polygon, where Michigan values range from “09S” to 01S” then (there is no “0S” , “00” or “0N”) from “01N” to “68N” where the S denotes south and N denotes north of the State’s baseline for the PLSS in Michigan.
 - (5.13.10.3) Attribute_Definition_Source: The Michigan PLSS is is a specific set of information about the PLSS irregular grid system for the State of Michigan. The Michigan geospatial data comes from the source: MGD. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online at <http://www.mcgi.state.mi.us/mgd>. Accessed 11 October 2014. The PLSS is structured according to the standards and practices from the citation: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov ; online at <http://www.blmsurveymanual.org/index.html> . Accessed 20 November 2012
 - (5.13.10.4) Attribute_Domain_Values:
 - (5.13.10.4.1) Enumerated_Domain: (not applicable)
 - (5.13.10.4.2) Range_Domain: (not applicable)
 - (5.13.10.4.3) Codeset_Domain:
 - (5.13.10.4.3.1) Codeset_Name: town or tier grid identifier values.
 - (5.13.10.4.3.2) Codeset_Source: Michigan PLSS.
- (5.13.11) Attribute:
 - (5.13.11.1) Attribute_Label: RANGE
 - (5.13.11.2) Attribute_Label_Definition: A three character text field containing the range grid identifier values for the PLSS grid system for that polygon, where Michigan values range from “20E” to 01E” then (there is no “0E” , “00” or “0W”) from “01W” to “49W” where the E denotes east and W denotes west of the State’s meridian for the PLSS in Michigan.
 - (5.13.11.3) Attribute_Definition_Source: The Michigan PLSS is is a specific set of information about the PLSS irregular grid system for the State of Michigan. The Michigan geospatial data comes from the source: MGD. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online at <http://www.mcgi.state.mi.us/mgd>. Accessed 11 October 2014. The PLSS is structured according to the standards and practices from the citation: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov; online at <http://www.blmsurveymanual.org/index.html> . Accessed 20 November 2012
 - (5.13.11.4) Attribute_Domain_Values:
 - (5.13.11.4.1) Enumerated_Domain: (not applicable)

- (5.13.11.4.2) Range_Domain: (not applicable)
- (5.13.11.4.3) Codeset_Domain:
 - (5.13.11.4.3.1) Codeset_Name: range grid identifier values.
 - (5.13.11.4.3.2) Codeset_Source: Michigan PLSS.
- (5.13.12) Attribute:
 - (5.13.12.1) Attribute_Label: TOWNRANGE
 - (5.13.12.2) Attribute_Label_Definition: An six character text field containing the concatenated value for town(or tier) and range values for the grid identifier for the PLSS grid system for that polygon in Michigan. Values are composed of the appropriate town values, where Michigan values range from “09S” to 01S” then (there is no “0S” , “00” or “0N”) from “01N” to “68N” where the S denotes south and N denotes north of the State’s baseline for the PLSS in Michigan and the appropriate range values, where Michigan values range from “20E” to 01E” then (there is no “0E” , “00” or “0W”) from “01W” to “49W” where the E denotes east and W denotes west of the State’s meridian for the PLSS in Michigan.
 - (5.13.12.3) Attribute_Definition_Source: The Michigan PLSS is is a specific set of information about the PLSS irregular grid system for the State of Michigan. The Michigan geospatial data comes from the source: MGD. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online at <http://www.mcgi.state.mi.us/mgdl>. Accessed 11 October 2014. The PLSS is structured according to the standards and practices from the citation: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov; online at <http://www.blmsurveymanual.org/index.html> . Accessed 20 November 2012.
 - (5.13.12.4) Attribute_Domain_Values:
 - (5.13.12.4.1) Enumerated_Domain: (not applicable)
 - (5.13.12.4.2) Range_Domain: (not applicable)
 - (5.13.12.4.3) Codeset_Domain: (not applicable)
 - (5.13.12.4.4) Unrepresentable_Domain: The concatenation of the town and range PLSS values creates 2,883 unique combinations of town and range grid identifier values which are listed (per polygon) in the fields TOWN and RANGE. These values themselves are from a codeset:
 - Codeset_Name: town and range grid identifier values.
 - Codeset_Source: Michigan PLSS.
- (5.13.13) Attribute:
 - (5.13.13.1) Attribute_Label: TOWN_RANGE
 - (5.13.13.2) Attribute_Label_Definition: An eight character text field containing the concatenated value for town(or tier) and range values for the grid identifier for the PLSS grid system for that polygon in Michigan. Values are composed of a “T” followed by the appropriate town values, where Michigan values range from “09S” to 01S” then (there is no “0S” , “00” or “0N”) from “01N” to “68N” where the S denotes south and N denotes north of the State’s baseline for the PLSS in Michigan and an “R” followed by the appropriate range values, where Michigan values range from “20E” to 01E” then (there is no “0E” , “00” or “0W”) from “01W” to “49W” where the E denotes east and W denotes west of the State’s meridian for the PLSS in Michigan. This field differs from the earlier field

TOWNRANGE by addition of the “T” and “R” before the respective town and range values in the concatenated string to identify the PLSS grid location of the specific polygon.

- (5.13.13.3) **Attribute_Definition_Source:** The Michigan PLSS is a specific set of information about the PLSS irregular grid system for the State of Michigan. The Michigan geospatial data comes from the source: MGD. 2012. Michigan Geographic Data Library. State of Michigan, Department of Technology, Management and Budget, Lansing, Michigan, USA. Online at <http://www.mcgi.state.mi.us/mgd>. Accessed 11 October 2014. The PLSS is structured according to the standards and practices from the citation: BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov; online at <http://www.blmsurveymanual.org/index.html> . Accessed 20 November 2012
- (5.13.13.4) **Attribute_Domain_Values:**
 - (5.13.13.4.1) **Enumerated_Domain:** (not applicable)
 - (5.13.13.4.2) **Range_Domain:** (not applicable)
 - (5.13.13.4.3) **Codeset_Domain:** (not applicable)
 - (5.13.13.4.4) **Unrepresentable_Domain:** The concatenation of the town and range PLSS values creates 2,883 unique combinations of town and range grid identifier values which are listed (per polygon) in the fields TOWN and RANGE. These values themselves are from a codeset:
 - Codeset_Name: town and range grid identifier values.
 - Codeset_Source: Michigan PLSS.
- (5.14) **Overview_Description:** GIS-RELATED DATA LAYER TABLES – the GIS Layer “Breeding Bird Atlas Block Outline Layer” attribute table. (see Entity_Type_Definition in Section 5.14.1.2)
- (5.14.1) **Entity_Type:** Feature Class or Shapefile (the data is provided in both formats)
 - (5.14.1.1) **Entity_Type_Label:** MichiganDNR_Breeding_Bird_Atlas_Blocks_outline
 - (5.14.1.2) **Entity_Type_Definition:** The lines making up the outer boundary of all the sum collection of MDNR Breeding Bird Atlas Blocks (see earlier GIS layer descriptions). Note: this layer contains no valid attribute information created for the BBA Project – except the placement of the boundary line or outer edge, and is used to “clip” other data sources to be compatible with these data extents in other GIS layers or to use as a simple layer to identify where the boundary of Michigan (and the BBA Blocks as a complete set) begins and ends. Note: the order of the following data fields are listed for the ESRI software ArcGIS personal geodatabase format layer; however, the ESRI software “shapefile” format layer version has these same fields but they may appear in a different order or may not be seen by all software tools used to view the shapefile format data.
 - (5.14.1.3) **Entity_Type_Definition_Source:** MDNR Wildlife Division Combo-BBA1-2 Project.
- (5.14.2) **Attribute:**
 - (5.14.2.1) **Attribute_Label:** OBJECTID
 - (5.14.2.2) **Attribute_Label_Definition:** Object ID is a unique, system generated sequential integer value which is automatically generated for polygons in this

- attribute table. Values are a digital numeric handle. Considered one of four fields required in the software layer, and should not be managed by users.
- (5.14.2.3) Attribute_Definition_Source: ESRI; ArcGIS version 10.1.
 - (5.14.2.4) Attribute_Domain_Values:
 - (5.14.2.4.1) Enumerated_Domain: (not applicable)
 - (5.14.2.4.2) Range_Domain:
 - (5.14.2.4.2.1) Range_Domain_Minimum: 0
 - (5.14.2.4.2.2) Range_Domain_Maximum: 2890
 - (5.14.2.5) Attribute_Units_of_Measure: natural or whole interger numbers, positive values.
 - (5.14.3) Attribute:
 - (5.14.3.1) Attribute_Label: SHAPE
 - (5.14.3.2) Attribute_Label_Definition: Software generated field containing a description of arc type. Considered one of four fields required in the software layer, and should not be managed by users.
 - (5.14.3.3) Attribute_Definition_Source: ESRI; ArcGIS version 10.1.
 - (5.14.3.4) Attribute_Domain_Values:
 - (5.14.3.4.1) Enumerated_Domain:
 - (5.14.3.4.1.1) Enumerated_Domain_Value: polygon
 - (5.14.3.4.1.2) Enumerated_Domain_Value_Definition: software generated definition of type of feature in vector-based GIS software.
 - (5.14.3.4.3) Enumerated_Domain_Value_Source: ESRI; ArcGIS version 10.1.
 - (5.14.4) Attribute:
 - (5.14.4.1) Attribute_Label: SHAPE_AREA
 - (5.14.4.2) Attribute_Label_Definition: Software-calculated measure of polygon area of each polygon, in geographic units for the layer. In this data layer, these are units of square meters. Values are double-precision numeric values. Considered one of four fields required in the software layer, and should not be managed by users.
 - (5.14.4.3) Attribute_Definition_Source: ESRI; ArcGIS version 10.1.
 - (5.14.4.4) Attribute_Domain_Values:
 - (5.14.4.4.1) Enumerated_Domain: (not applicable)
 - (5.14.4.4.2) Range_Domain:
 - (5.14.4.4.2.1) Range_Domain_Maximum: 251071233665.000000000000
 - (5.14.4.4.2.2) Range_Domain_Maximum: 251071233665.000000000000
 - (5.14.4.5) Attribute_Units_of_Measure: square meters.
 - (5.14.5) Attribute:
 - (5.14.5.1) Attribute_Label: SHAPE_LENGTH
 - (5.14.5.2) Attribute_Label_Definition: Software-calculated measure of polygon perimeter or length of outer edge of each polygon in geographic units for the layer. In this data layer, these are units of linear meters. Values are double-precision numeric values. Considered one of four fields required in the software layer, and should not be managed by users.
 - (5.14.5.3) Attribute_Definition_Source: ESRI; ArcGIS version 10.1.
 - (5.14.5.4) Attribute_Domain_Values:
 - (5.14.5.4.1) Enumerated_Domain: (not applicable)
 - (5.14.5.4.2) Range_Domain:
 - (5.14.5.4.2.1) Range_Domain_Minimum: 2672730.42947999990
 - (5.14.5.4.2.2) Range_Domain_Maximum: 2672730.42947999990
 - (5.14.5.5) Attribute_Units_of_Measure: meters.

- (5.14.6) Attribute:
 - (5.14.6.1) Attribute_Label: ST
 - (5.14.6.2) Attribute_Label_Definition: A two character text field containing the value for the State of the Breeding Bird Atlas Block, using the two-character text label standard for the United States Postal Service code. For Michigan, the value is "MI".
 - (5.14.6.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.14.6.4) Attribute_Domain_Values:
 - (5.14.6.4.1) Enumerated_Domain:
 - (5.14.6.4.1.1) Enumerated_Domain_Value: MI
 - (5.14.6.4.1.2) Enumerated_Domain_Value_Definition: Michigan, i.e., the State of Michigan. Comment; field used if or when blocks combined in great lakes regional area, etc.
 - (5.14.6.4.3) Enumerated_Domain_Value_Source: USPS.
- (5.14.7) Attribute:
 - (5.14.7.1) Attribute_Label: STATE
 - (5.14.7.2) Attribute_Label_Definition: State, a ten character text field containing a description of the State, using the official name of State as set as standard for the US Postal Service, names of States in the United States.
 - (5.14.7.3) Attribute_Definition_Source: USPS. 2010. United States of America Postal Service Postal Addressing Standards, revised April 2010. USPS publication Postal Service Number 7610-03-000-3688. USPS, Washington, DC, USA. Publication information is online at <http://pe.usps.gov/text/pub28/welcome.htm>.
 - (5.14.7.4) Attribute_Domain_Values:
 - (5.14.7.4.1) Enumerated_Domain:
 - (5.14.7.4.1.1) Enumerated_Domain_Value: Michigan
 - (5.14.7.4.1.2) Enumerated_Domain_Value_Definition: Michigan, i.e., the State of Michigan. Comment; field used if or when blocks combined in great lakes regional area, etc.
 - (5.14.7.4.3) Enumerated_Domain_Value_Source: USPS.

Section 6: Distribution Information

(6.) Distribution_Information:

(6.1) Distributor:

(6.1.1) Contact_Person_Primary

(6.1.1.1) Contact_Person: Marshall Strong or alternate contact Karen Cleveland (but recommend using the contact position and contact organization, listed below).

(6.1.1.2) Contact_Organization: State of Michigan, Department of Natural Resources (DNR), Wildlife Division.

(6.1.2) Contact_Organization_Primary: State of Michigan, Department of Natural Resources (DNR), Wildlife Division.

(6.1.3) Contact_Position: MDNR Wildlife Division's Mapping and Geotechnology Program Specialist, or use alternate contact position of MDNR Wildlife Division All Bird Biologist.

(6.1.4) Contact_Address:

(6.1.4.1) Address_Type: mailing address.

(6.1.4.2) Address: P.O. Box 30444,

(6.1.4.3) City: Lansing

(6.1.4.4) State_or_Province: MI

(6.1.4.5) Postal_Code (ZIP or ZIP+): 48909-7944

(6.1.4.6) Country: United States of America

(6.1.5) Contact_Voice_Telephone: 1-517-284-9453.

(6.1.6) Contact_TDD/TTY_Telephone: 711 (Michigan Relay Center).

(6.1.7) Contact_Facsimile_Telephone: 1-517-373-9566.

(6.1.8) Contact_Electronic_Mail_Address: DNR-Wildlife@michigan.gov ; Comment: those interested can also see the MDNR website online at <http://www.michigan.gov/dnr> for more information.

(6.1.9) Contact_Hours_of_Service: recommended GMT 12noon – 8pm or United States Eastern Standard Time 8am – 5pm

(6.1.10) Contact_Instructions: no significant instructions, other than: (a.) Please have patience as it may take a couple of days to reply back to questions, depending on the methods used (email, etc.) to contact our organization, (b.) please refer to this data set by its proper name of "Michigan Breeding Bird Atlas data set" or other relevant details, in any message or with questions.

(6.2) Resource_Description **The Michigan Breeding Bird Atlas (I and II) Digital Data Set, Project Documentation, and Metadata**; see Section 1 ([above](#)) to identify data.

(6.3) Distribution_Liability:

The user is responsible for reading and comprehending all portions of these metadata before using any of the companion data. Any use of these data signifies a user's understanding of all stated warnings, disclaimers, and notices, and agreement to comply with all stated constraints in these metadata/data. The Michigan Department of Natural Resources provides these metadata and companion data without any express or implied warranties, including, without limitation, the implied warranties of merchantability and fitness for a particular purpose. The State of Michigan, the DNR, and any employees shall not be held liable for improper or incorrect use of these data, and these data are not intended for legal use. The MDNR reserves all rights and copyrights, as appropriate, as the steward for these data for the public trust; these data may not be repackaged or sold. The information contained in these data may have changed since the dataset was last updated. Newer versions of these data may be available on an irregular schedule, and the dataset may be updated without notice; however that does not mean these

metadata or data will ever be changed again (rather than the possibility is always reserved). For more information, communicate with the contact person listed in this metadata file for these data. Do not pass these data to other users; direct other users seeking these metadata or companion data to the contact person listed in this metadata file or the provided data access and download location. There are other warnings, disclaimers and notifications prepared for possible end users of these metadata and companion data – ensure you read all the provided information to avoid problems related to their use. Some statements may be repeated, as they are appropriate content for multiple metadata blocks. Ensure that you read Sections 1.7 Access Constraints and Section 1.8 Use Constraints for directly relevant details impacting users.

(6.4) Standard_Order_Process:

(6.4.1) Non-Digital_Form: not applicable, as this is only a digital data set.

(6.4.2) Digital_Form:

(6.4.2.1) Digital_Transfer_Information:

Format_Name: ZIP (WinZIP).

Format_Version_Number: 10.0 (10.0.6685).

Format_Version_Date: 2005

Format_Specification: Details on format and WinZIP utility, are online at the manufacturer's website on the internet at <http://www.winzip.com>, email support@winzip.com, WinZIP International LLC, at postal address P.O. Box 540, Mansfield, CT 06268 USA.

Format_Information_Content: various project files, in standard formats and explained in a "readme" text file compressed with those files.

Format_File-Decompression_Technique: use WinZIP or compatible software utility.

Transfer_Size: (not applicable).

(6.4.2.2) Digital_Transfer_Option:

Online_Option:

Computer_Contact_Information: <http://www.michigandnr.com>

Network_Address: <http://www.michigandnr.com>

Network_Resource_Name: http://www.michigandnr.com/ftp/wildlife/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set_pkg.zip

Network_Resource_Instructions: Use an internet browser to connect to location http://www.michigandnr.com/ftp/wildlife/Michigan_DNR-Wildlife_breeding-bird-atlas_data_set; then click on the file "Michigan_DNR-Wildlife_breeding-bird-atlas_data_set_pkg.zip" and download.

Dial-up_Instructions: (not applicable).

Access_Instructions: Use an internet browser to connect to the online options discussed above.

Online_Computer_and_Operating_Instructions: Computer details will not be provided here. The online system is a dedicated internet server which is maintained for backward compatibility with HTTP communication protocols, and should be flexible to both older and newer connection versions plus various browser software and various operating systems.

Offline_Option: Offline options are limited and will have to be discussed as a custom order process (see the next section) with contacts.

Comments; see [Section 6.6 comments](#) for additional technical details.

(6.5) Custom_Order_Process: Custom order options are very limited; anyone interested in such should first try using the online method. After that, if the online method is not

possible, contact the following and discuss possible offline request options. Note that there may be a fee or requirement that requestor provide media for any offline option.

(6.5.1) Contact_Person_Primary

(6.5.1.1) Contact_Person: Marshall Strong or alternate contact Karen Cleveland (but recommend using the contact position and contact organization, listed below).

(6.5.1.2) Contact_Organization: State of Michigan, Department of Natural Resources, Wildlife Division.

(6.5.2) Contact_Organization_Primary: State of Michigan, Department of Natural Resources, Wildlife Division.

(6.5.3) Contact_Position: MDNR Wildlife Division Mapping and Geotechnology Program Specialist, or use alternate contact position of MDNR Wildlife Division All Bird Biologist.

(6.5.4) Contact_Address:

(6.5.4.1) Address_Type: mailing address.

(6.5.4.2) Address: P.O. Box 30444

(6.5.4.3) City: Lansing

(6.5.4.4) State_or_Province: MI

(6.5.4.5) Postal_Code (ZIP or ZIP+): 48909-7944

(6.5.4.6) Country: United States of America

(6.5.5) Contact_Voice_Telephone: 1-517-284-9453.

(6.5.6) Contact_TDD/TTY_Telephone: 711 (Michigan Relay Center).

(6.5.7) Contact_Facsimile_Telephone: 1-517-373-9566.

(6.5.8) Contact_Electronic_Mail_Address: DNR-Wildlife@michigan.gov

Comment: those interested can also see the MDNR website online at <http://www.michigan.gov/dnr> for more information.

(6.5.9) Contact_Hours_of_Service: recommended GMT 12noon – 8pm or United States Eastern Standard Time 8am – 5pm

(6.5.10) Contact_Instructions: no significant instructions, other than: (a.) Please have patience as it may take a couple of days to reply back to questions, depending on the methods used (email, etc.) to contact our organization, (b.) please refer to this data set by its proper name of “Michigan Breeding Bird Atlas data set” or other relevant details, in any message or with questions.

(6.6) Technical_Prerequisites: Technical prerequisites are multifold, as this is a complex data set with several resources. The packaged data includes both tabular and GIS data. A prepared user should have the available software as discussed below, and should have enough skill and experience to use the software and compatible data packaged and described within this documentation/metadata. The final data set developed on and compatible with (a.) IBM-format compatible computers; (b.) the Microsoft Windows XP Professional operating system (OS) and Microsoft Windows 2000 OS for servers; (c.); database management software Microsoft Access 2003 build 11.8321.8341, service pack 3 and Microsoft Access 2010; (d.) geographic information system software ESRI ArcGIS9.3.1 service pack 2b and Esri ArcGIS 10.1.0.3035; (e.) documentation was generated using Microsoft Word 2003, build 11.8348.8341, service pack 3 and the documentation was converted to be compatible with Adobe PDF format; and (f.) any other provided files with the compiled data set are compatible with plain ASCII text viewer formats or internet browser formats (i.e. txt, HTML, JPG image formats). Note that Adobe Reader for Adobe PDF files is a freeware tool at time of this documentation and is downloadable off the company web site at <http://www.adobe.com>.

(6.6 comments:

The rest of this comments section is those important details included in the ASCII-text-only file with the packaged data set, and helps explain the actual files, what type, exact names, provides lead for information on file type and software to use, and other details which are needed immediately when a potential user “un-zipps” or extracts those data files (and which includes this document/metadata, as a PDF file).

=====

date: 2016 August 01

file: README_package_contains.txt

description: this file lists those files which should be grouped and included in either a set or one zip file. Please check you have all these files, which constitute the set, and are not missing a file.

Citation for the packaged digital data set which includes official metadata:

MDNR. 2016. The Michigan Department of Natural Resources (MDNR): Michigan Breeding Bird Atlas I and II Project Documentation, and Metadata (includes information about the compatible combined Atlas I and Atlas II data, plus compatible GIS block layer). MDNR, Wildlife Division Report 3622. MDNR, Wildlife Division, PO Box 30444, Lansing, Michigan, 48909-7944 USA. 174pg. Revised 2016 August 01. < http://www.michigandnr.com/ftp/wildlife/Michigan_MDNR-Wildlife_breeding-bird-atlas_data_set >

Citation for the project documentation and official metadata:

MDNR. 2016. The Michigan Department of Natural Resources (MDNR): Michigan Breeding Bird Atlas I and II Digital Data Set, Project Documentation, and Metadata (includes compatible combined Atlas I and Atlas II data, plus compatible GIS block layer). MDNR, Wildlife Division Report 3622. MDNR, Wildlife Division, PO Box 30444, Lansing, Michigan, 48909-7944 USA. 174pg. Revised 2016 August 01. < http://www.michigandnr.com/ftp/wildlife/Michigan_MDNR-Wildlife_breeding-bird-atlas_data_set >.

Files Included in the Complete Packaged Data:

=====

34 files, totaling 170,765,314 bytes.

=====

Note: this is not meaning the compressed “zip” file but contents in the “zip” file, and explanations of these files are in the project documentation/metadata file.

The “zip” file is =

Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_plus_doc_metadata.zip

***For detail explanation of a .ZIP file, see the information online at

[https://en.wikipedia.org/wiki/Zip_\(file_format\)](https://en.wikipedia.org/wiki/Zip_(file_format))

***At the end of this file is a Microsoft (MS) DOS file listing which shows the actual size details for the files. Note that dates vary as some are old (but valid) files, and will not all be the August 01, 2016 date (completion of the metadata and packaging).

If having problems with a file, check the size and ensure it is as listed; if still problems, we recommend re-downloading the "zip" file and re-extracting.

Within the "zip" file or grouped when extract/"unzip" the files, should be the following:

***For detail explanation of a .PDF document file, see the information online at

<http://www.adobe.com>

The project documentation and official metadata file =
Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_doc_and_metadata.pdf

***For detail explanation of a .JPG image file, see the information online at
<https://en.wikipedia.org/wiki/JPEG>

The official FGDC metadata listed and provided URL/hyperlink browse graphic =
Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_browse_graphic.jpg

Three map figures found within the document (provided for ease of use) =
Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_map-fig-
1_browse_graphic.jpg
Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_map-fig-
2_browse_graphic.jpg
Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_map-fig-
3_browse_graphic.jpg

Four supporting BBA2 project files (cited in document):
MBBAII_Handbook_final_v2010-12-23.pdf
MBBAII_Casual_Observers_Handbook_v2008-june-19.pdf
MBBAII_Point_Handbook_v2011-january-11.pdf
Bird_breeding_season_species_and_dates_v2011-january-11.pdf

The tabular (relational database) of field observation data, is provided in two options:

***For detail explanation of a .MDB file, see the information online at
<https://support.office.com/en-us/article/Which-Access-file-format-should-I-use-012d9ab3-d14c-479e-b617-be66f9070b41>
and
https://support.office.com/en-us/article/Which-Access-file-format-should-I-use-012d9ab3-d14c-479e-b617-be66f9070b41#_toc306205042

The tabular (relational database) files, in Microsoft Access v2003 software format =
MichiganDNR_MI-BBA1n2combo_data_set_v2016_-_public_release_-_MS-Access-v2003.mdb
<The .mdb file format was introduced circa 2003 in MS Access 2003 (before Access 2007)>.

***For detail explanation of a .ACCDB file, see the information online at
<https://support.office.com/en-us/article/Which-Access-file-format-should-I-use-012d9ab3-d14c-479e-b617-be66f9070b41>
and
https://support.office.com/en-us/article/Which-Access-file-format-should-I-use-012d9ab3-d14c-479e-b617-be66f9070b41#_toc306205041

MichiganDNR_MI-BBA1n2combo_data_set_v2016_-_public_release_-_MS-Access-
v2010.accdb
<The .accdb file format that was introduced in Access 2007, offers many benefits that
are unavailable in earlier file formats. The database is provided in both .mdb and
.accdb formats, but the original data base format was Access 2003 and the .mdb file>.

GIS data is provided in two options, as some may only be able to use either the geodatabase
(which is the recommended option) or the older shapefile format (which still works but limits what
database join or relates can be done to the MS Access database information).

***For detail explanation of a geodatabase, see the information online at

<http://desktop.arcgis.com/en/arcmap/10.3/manage-data/geodatabases/what-is-a-geodatabase.htm>

The geospatial (GIS) data in ESRI geodatabase =
MichiganDNR_Breeding_Bird_Atlas_GIS_data.mdb
<Note: this is compatible with MS Access 2003 but is not actually a MS Access file, rather a special format ESRI (www.esri.com) database format which contains the same information as provided in the 3 shapefiles below, composed of 6 files each or total of 18 files.>

***For detail explanation of a shapefile, see the information online at
<http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#//00560000002000000.htm>

The geospatial (GIS) data in ESRI shapefile format (the shapefile name is misleading as actually means multiple files define a layer, where same name (left of the dot) but different extension names (right of the dot) like .shp, .shx, .sbn, .sbx, .dbf, .prj):
MichiganDNR_BBA_Atlas_area_outline_polygon.shp (+.shx, .sbn, .sbx, .dbf, .prj) or 6 files;
MichiganDNR_BBA_Atlas_Blocks_polygons.shp (+.shx, .sbn, .sbx, .dbf, .prj) or 6 files;
MichiganDNR_BBA_projected_TR_blocks_polygons.shp (+.shx, .sbn, .sbx, .dbf, .prj) or 6 files;

Or to list these completely (repeating the file name) they are:

MichiganDNR_BBA_Atlas_area_outline_polygon.shp
MichiganDNR_BBA_Atlas_area_outline_polygon.sbn
MichiganDNR_BBA_Atlas_area_outline_polygon.sbx
MichiganDNR_BBA_Atlas_area_outline_polygon.shx
MichiganDNR_BBA_Atlas_area_outline_polygon.dbf
MichiganDNR_BBA_Atlas_area_outline_polygon.prj
MichiganDNR_BBA_Atlas_Blocks_polygons.shp
MichiganDNR_BBA_Atlas_Blocks_polygons.sbn
MichiganDNR_BBA_Atlas_Blocks_polygons.sbx
MichiganDNR_BBA_Atlas_Blocks_polygons.shx
MichiganDNR_BBA_Atlas_Blocks_polygons.dbf
MichiganDNR_BBA_Atlas_Blocks_polygons.prj
MichiganDNR_BBA_projected_TR_blocks_polygons.shp
MichiganDNR_BBA_projected_TR_blocks_polygons.sbn
MichiganDNR_BBA_projected_TR_blocks_polygons.sbx
MichiganDNR_BBA_projected_TR_blocks_polygons.shx
MichiganDNR_BBA_projected_TR_blocks_polygons.dbf
MichiganDNR_BBA_projected_TR_blocks_polygons.prj

An ASCII-text-only file listing those files above with details =
README_package_contains_these_files.txt

=====
The zip file details:

=====
date time(est) size-in-bytes file-name

08/11/2016 05:26 PM 74,402,987 Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_plus_doc_metadata.zip

=====
List of the specific files discussed above and contained in the zip file:

=====
date time(est) size-in-bytes file-name

The Michigan Department of Natural Resources
Michigan Breeding Bird Atlas (I and II) Project Documentation and Metadata – Revised 08/11/2016

08/11/2016 05:20 PM 11,526 README_package_contains_these_files.txt

08/11/2016 05:23 PM 7,274,069 Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_doc_and_metadata.pdf

08/03/2016 04:00 PM 1,428,547 Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_browse_graphic.jpg

08/03/2016 04:00 PM 1,428,547 Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_map-fig-1_browse_graphic.jpg

08/03/2016 03:53 PM 1,482,382 Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_map-fig-2_browse_graphic.jpg

08/03/2016 04:40 PM 1,584,260 Michigan-DNR-Wildlife_Breeding-Bird-Atlas1and2combo_data_set_map-fig-3_browse_graphic.jpg

01/11/2011 03:49 PM 42,582 Bird_breeding_season_species_and_dates_v2011-january-11.pdf

06/19/2008 02:50 PM 584,404 MBBAIL_Casual_Observers_Handbook_v2008-june-19.pdf

12/23/2010 02:26 PM 3,742,101 MBBAIL_Handbook_final_v2010-12-23.pdf

01/11/2011 03:37 PM 2,547,030 MBBAIL_Point_Handbook_v2011-january-11.pdf

11/19/2012 02:18 PM 59,858,944 MichiganDNR_MI-BBA1n2combo_data_set_-_public_release_-_MS-Access_v2016.mdb

11/19/2012 02:34 PM 59,944,960 MichiganDNR_MI-BBA1n2combo_data_set_-_public_release_-_MS-Access_v2016.accdb

03/25/2014 05:34 PM 13,164,544 MichiganDNR_Breeding_Bird_Atlas_GIS_data.mdb

10/26/2012 07:13 PM 182,300 MichiganDNR_BBA_Atlas_area_outline_polygon.shp

11/27/2012 11:43 AM 236 MichiganDNR_BBA_Atlas_area_outline_polygon.dbf

10/26/2012 07:13 PM 545 MichiganDNR_BBA_Atlas_area_outline_polygon.prj

11/14/2012 02:28 PM 132 MichiganDNR_BBA_Atlas_area_outline_polygon.sbn

11/14/2012 02:28 PM 116 MichiganDNR_BBA_Atlas_area_outline_polygon.sbx

10/26/2012 07:13 PM 108 MichiganDNR_BBA_Atlas_area_outline_polygon.shx

11/09/2012 06:38 PM 3,258,596 MichiganDNR_BBA_Atlas_Blocks_polygons.shp

11/27/2012 11:49 AM 2,901,087 MichiganDNR_BBA_Atlas_Blocks_polygons.dbf

11/09/2012 06:38 PM 545 MichiganDNR_BBA_Atlas_Blocks_polygons.prj

12/13/2012 03:43 PM 114,284 MichiganDNR_BBA_Atlas_Blocks_polygons.sbn

12/13/2012 03:43 PM 9,420 MichiganDNR_BBA_Atlas_Blocks_polygons.sbx

11/09/2012 06:38 PM 89,692 MichiganDNR_BBA_Atlas_Blocks_polygons.shx

11/09/2012 06:38 PM 1,535,512 MichiganDNR_BBA_projected_TR_blocks_polygons.shp

11/27/2012 11:47 AM 344,264 MichiganDNR_BBA_projected_TR_blocks_polygons.dbf

11/09/2012 06:38 PM 545 MichiganDNR_BBA_projected_TR_blocks_polygons.prj

11/14/2012 02:27 PM 29,564 MichiganDNR_BBA_projected_TR_blocks_polygons.sbn

11/14/2012 02:27 PM 2,628 MichiganDNR_BBA_projected_TR_blocks_polygons.sbx

11/09/2012 06:38 PM 23,220 MichiganDNR_BBA_projected_TR_blocks_polygons.shx

34 File(s) 170,755,609 bytes

=====
(end-of-file)

Section 7: Metadata Reference Information

- (7.) Metadata_Reference_Information:
 - (7.1) Metadata_Date: 2016 July 25.
 - (7.2) Metadata_Review_Date: (not applicable).
 - (7.3) Metadata_Future_Review_Date: none planned.
 - (7.4) Metadata_Contact:
 - (7.4.1) Contact_Person_Primary:
Contact_Person: Marshall Strong or alternate contact Karen Cleveland (but recommend using the contact position and contact organization, listed below).
Contact_Organization: State of Michigan, Department of Natural Resources, Wildlife Division.
 - (7.4.2) Contact_Organization_Primary: State of Michigan, Department of Natural Resources, Wildlife Division.
 - (7.4.3) Contact_Position: MDNR Wildlife Division Mapping and Geotechnology Program Specialist, or use alternate contact position of MDNR Wildlife Division All Bird Biologist.
 - (7.4.4) Contact_Address:
 - (7.4.4.1) Address_Type: mailing address.
 - (7.4.4.2) Address: P.O. Box 30444
 - (7.4.4.3) City: Lansing
 - (7.4.4.4) State_or_Province: MI
 - (7.4.4.5) Postal_Code (ZIP or ZIP+): 48909-7944
 - (7.4.4.6) Country: United States of America
 - (7.4.5) Contact_Voice_Telephone: 1-517-284-9453.
 - (7.4.6) Contact_TDD/TTY_Telephone: 711 (Michigan Relay Center).
 - (7.4.7) Contact_Facsimile_Telephone: 1-517-373-9566.
 - (7.4.8) Contact_Electronic_Mail_Address: DNR-Wildlife@michigan.gov ; Comment: those interested can also see the MDNR website online at <http://www.michigan.gov/dnr> for more information.
 - (7.4.9) Contact_Hours_of_Service: recommended GMT 12noon – 8pm or United States Eastern Standard Time 8am – 5pm
 - (7.4.10) Contact_Instructions: no significant instructions, other than: (a.) Please have patience as it may take a couple of days to reply back to questions, depending on the methods used (email, etc.) to contact our organization, (b.) please refer to this data set by its proper name of “Michigan Breeding Bird Atlas data set” or other relevant details, in any message or with questions.
 - (7.5) Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata with the National Biological Information Infrastructure (NBII) add-on information.
 - (7.6) Metadata_Standard_Version: FGDC-STD-001-1998 with NBII add-on to attribute section.
 - (7.7) Metadata_Time_Convention: local time (USA EST).
 - (7.8) Metadata_Access_Constraints: none.
 - (7.9) Metadata_Use_Constraints: none.
 - (7.10) Metadata_Security_Information:
 - (7.10.1) Metadata_Security_Classification_System: (not applicable as no constraints).
 - (7.10.2) Metadata_Security_Classification: (not applicable as no constraints).
 - (7.10.3) Metadata_Security_Handling_Description: (not applicable as no constraints).

Acknowledgements:

In addition to the assistance and support of those listed in the first few pages and which include those who provided funding and/or support for BBA1 and BBA2, this dataset would not be possible without the assistance of several important conservation partners and of some specific MDNR Wildlife Division staff:

- Breeding Bird Atlas I Technical Committee: Raymond Adams, Glenn Belyea, Robert Hess, Vic Janson, Larry Master, Gail McPeck, Larry Ryel, Judy Soule, Sylvia Taylor, Leni Wilsmann, and Richard Wolinski
- Breeding Bird Atlas II Technical Committee
- MDNR Wildlife Division, All-Bird Biologist Specialist, Karen Cleveland.
- MDNR Wildlife Division, Wildlife Mapping and Geotechnology Program Specialist, Marshall Strong.

Citations Used in this Document:

- AOU. 2012. The American Ornithologists' Union Bird Species Check-list for North American Birds. The American Ornithologists' Union, 5405 Villa View Drive, Farmington, NM 87402 USA ; telephone 1-505-326-1579 ; e-mail aou@aou.org ; online at <http://www.aou.org> . Publication is available online at <http://www.aou.org/checklist/north/full.php> . Accessed 20 November 2012. Note: citation specifically utilized the 7th check-list and supplements through 08 August 2011.
- BLM. 2009. The Manual of Instructions for the Survey of the Public Lands of the United States, 20089989 (also known as the official Public Land Survey System manual). Bureau of Land Management (1946 to present) and Government Land Office (1881 to 1946), United States Department of the Interior, 1849 C Street NW, Room 5665, Washington, D.C. 20240, USA ; telephone 1-202-208-3801 ; facsimile 1-202-208-5242 ; e-mail questions@blm.gov ; online at < <http://www.blm.gov> >. Publication is available online at <http://www.blmsurveymanual.org/index.html> ; hardcopy available from the U.S. Government Printing Office online at <http://www.gpo.gov> . Accessed 20 November 2012
- Brewer, R., G.A. McPeck, and R.J. Adams, Jr. 1991. The Atlas of Breeding Birds of Michigan (the "BBA1 Atlas book"). Michigan State University Press. East Lansing, Michigan, USA. Available online at <http://www.mibirdatlas.org> . The Kalamazoo Nature Center, 7000 N. Westnedge Avenue, Kalamazoo, Michigan 49009-6309 USA ; telephone 1-269-381-1574 ; facsimile 1-269-381-2557 ; e-mail info@naturecenter.org ; online at <http://naturecenter.org> . Publication is available online at <http://www.mibirdatlas.org> . Accessed 20 November 2012
- Chartier, A.T., J.J.Baldy, and J.M.Brenneman. 2011. The Second Michigan Breeding Bird Atlas (the "BBA2 Atlas book"), 2002-2008. Kalamazoo Nature Center. Kalamazoo, Michigan, USA. Available online at <http://www.mibirdatlas.org> . The Kalamazoo Nature Center, 7000 N. Westnedge Avenue, Kalamazoo, Michigan 49009-6309 USA ; telephone 1-269-381-1574 ; facsimile 1-269-381-2557 ; e-mail info@naturecenter.org ; online at <http://naturecenter.org> . Publication is available online at <http://www.mibirdatlas.org> . Accessed 20 November 2012

- DNR. 2009. Michigan Administrative Code, Michigan Department of Natural Resources Wildlife Division, Endangered and Threatened Species Rule 299.1026 Birds; by authority conferred on the Michigan Department of Natural Resources by Section 36503 Public Act 451 of 1994, Michigan Compiled Laws 324.36503 ; Revised and effective 2009. Michigan Department of Natural Resources Wildlife Division, State of Michigan, P.O. Box 30444, Lansing, Michigan 48909 USA; telephone 517-284-9453; facsimile 517-373-9566; online at <http://www.michigan.gov/dnr>. Publication is available online at http://www7.dleg.state.mi.us/orr/Files/AdminCode/102_46_AdminCode.pdf . Accessed 20 November 2012
- DNR. 2012. Michigan Department of Natural Resources Wildlife Division, State of Michigan, Post Office Box 30444, Lansing, Michigan 48909 USA; telephone 1-517-284-9453; facsimile 1-517-373-9566; online at <http://www.michigan.gov/dnr> . Accessed 20 November 2012.
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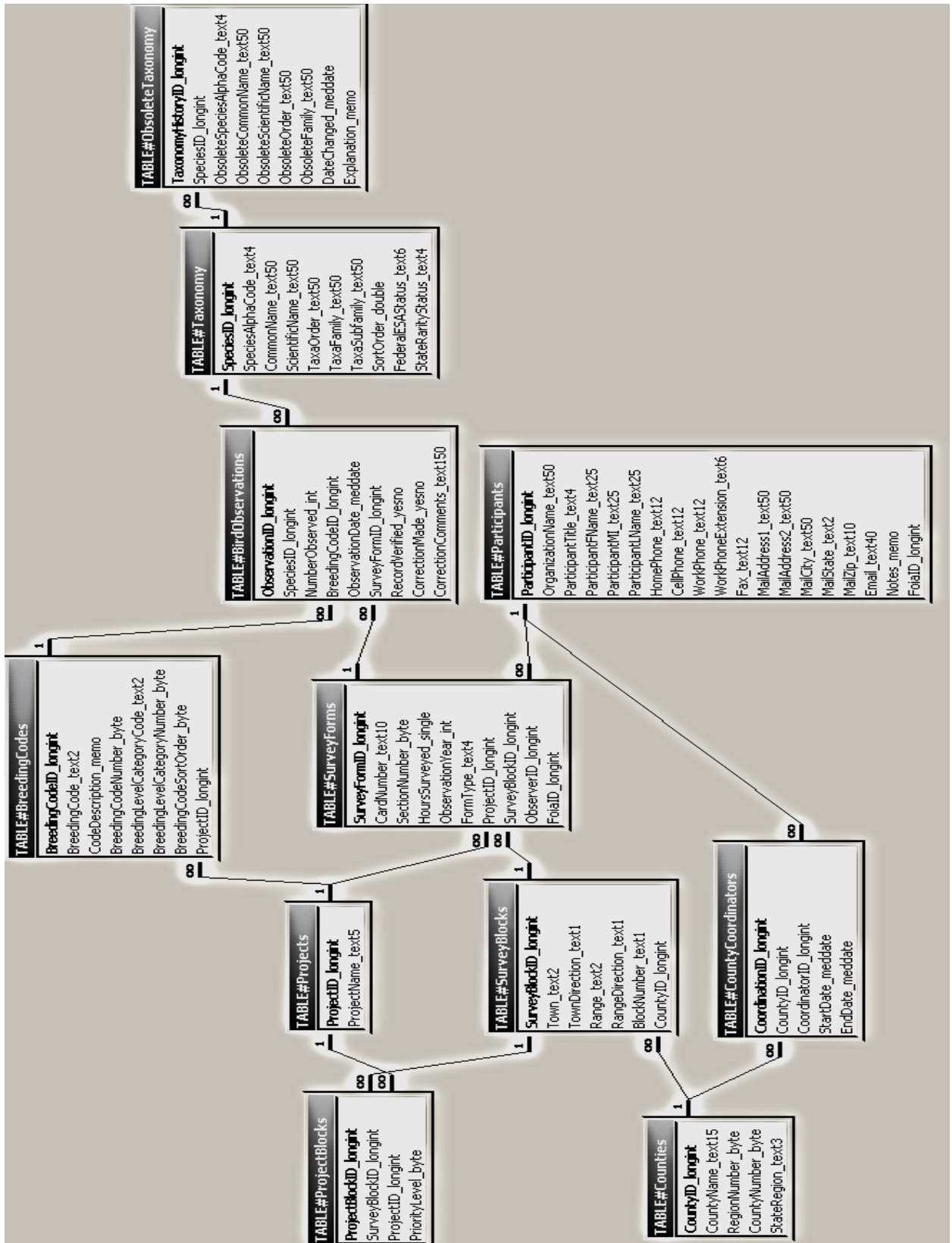
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A larger-size duplicate of “Figure 14. Relationship diagram of new Breeding Bird Atlas database.” Because the information is important to understanding the data set.
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